environmental
impact
statement

KINDER WATERSHED

Allen and Jefferson Davis Parishes, Louisiana

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

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KINDER WATERSHED
Allen and Jefferson Davis Parishes
Louisiana

FINAL ENVIRONMENTAL IMPACT STATEMENT

Alton Mangum, State Conservationist
Soil Conservation Service

Sponsoring Local Organization

Calcasieu Soil and Water Conservation District
Post Office Box 211
Leesville, Louisiana 71446

Gulf Coast Soil and Water Conservation District
Post Office Box 1236
Lake Charles, Louisiana 70601

Allen Parish Police Jury
Post Office Drawer G
Oberlin, Louisiana 70655

Kinder Drainage District No. 2
Post Office Box 6487
Reeves, Louisiana 70658

Jefferson Davis Parish Police Jury
Courthouse Building
Jennings, Louisiana 70546

Jefferson Davis Parish Consolidated Gravity Drainage District No. 1
Route 1, Box 106
Elton, Louisiana 70532

January 1975

PREPARED BY
UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Post Office Box 1630
Alexandria, Louisiana 71301

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USDA ENVIRONMENTAL IMPACT STATEMENT

Kinder Watershed Project

Allen and Jefferson Davis Parishes

Louisiana

Prepared in Accordance with

Sec. 102(2)(c) of P. L. 91-190

Summary Sheet

I. Final

II. Soil Conservation Service

III. Administrative

IV. Description of Project, Purpose, and Action: This project is for watershed protection, flood prevention, and drainage in Allen and Jefferson Davis Parishes, Louisiana, to be implemented under the authority of the Watershed Protection and Flood Prevention Act (PL-566, 83d Congress, 68 Stat. 666), as amended. The planned works include conservation land treatment supplemented by channel work which includes excavation, clearing, structures for water control (weirs), and structures for water control (pipe drops). Excavation will involve 55 miles of existing channels and 10 miles of new construction while clearing will involve 8 miles of existing channels. Of the 63 miles of work proposed on existing channels, 53 miles have ephemeral flow and 10 miles have intermittent flow.

V. Environmental Impact and Adverse Environmental Effects: Floodwater and drainage problems will be reduced resulting in lower production costs, better quality of products, and higher yields. An estimated 165 farmers will directly benefit from the installation of project measures and land treatment. The remaining 35 farmers will benefit from accelerated land treatment. These measures will also provide benefits for the 430 farm family members. Farm employees will also benefit. A total of 32,900 acres of cropland and pastureland will directly benefit from the combined program of land treatment and structural measures. An additional 4,000 acres of cropland and pastureland will benefit from accelerated land treatment and rotation systems. Flood damages to 10 miles of gravel and hard-surfaced roads will be reduced. Sheet erosion will be reduced

12 percent and sediment delivered to Calcasieu River as a result of sheet erosion will be reduced by 41 percent. Installation of six structures for water control will create 36 acres of permanent water. Nuisance damages to residences in Kinder will be reduced. Temporary increases of open land game and nongame species of wildlife will result from the conversion of forest to open land along channels. About 2,500 acres of forest land will be adequately treated. The effectiveness of the low-level dam on Calcasieu River for ground water recharge will be aided by the reduction of sediment. The project will create about 62 man-years of local labor over the installation period. Operation and maintenance will create 1 man-year annually of local labor over the project life.

Construction will result in approximately 1,310 tons of sediment being delivered to Calcasieu River during project installation causing a temporary local increase in turbidity. About 150 acres of cropland, 187 acres of wooded channel banks, and 123 acres of forest land not presently occupied by channel rights-of-way will be disturbed. Consequently, reductions of some game and nongame animals will occur. Timber losses on forest land required for project installation will amount to 237 acres. Crop and pasture losses on open land required for project installation will amount to 150 acres. Sixty acres of Type I wetlands will be adversely affected by channel construction. Occasional periods of aquatic weed growth may occur in the permanent water areas created by the weirs.

VI. List of Alternatives Considered:

A. Land Treatment Only
B. Leveed Floodways, Pumps, and Land Treatment
C. Floodwater Retarding Structures and Land Treatment
D. Channel Work Required to Provide the 1.5-, 3-, and 5-year Levels of Protection and Land Treatment
E. No Project Action

VII. Comments have been received from the following agencies:

Department of the Army
Department of the Interior, Geological Survey
Department of Transportation
Environmental Protection Agency
Louisiana Commission on Intergovernmental Relations
Louisiana Department of Art, Historical, and Cultural Preservation
Louisiana Health and Human Resources Administration
Louisiana Forestry Commission

VIII. Draft Statement Transmitted to CEQ on November 25, 1974.

USDA SOIL CONSERVATION SERVICE

ENVIRONMENTAL IMPACT STATEMENT

for

Kinder Watershed

Allen and Jefferson Davis Parishes, Louisiana

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83d Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATION

Calcasieu Soil and Water Conservation District

Gulf Coast Soil and Water Conservation District

Allen Parish Police Jury

Kinder Drainage District No. 2

Jefferson Davis Parish Police Jury

Jefferson Davis Parish Consolidated Gravity Drainage District No. 1

PROJECT OBJECTIVES AND PURPOSES

The project objectives are:

1. Provide improved farming conditions to increase farm family incomes and improve living conditions.

2. Reduce erosion on cropland to the minimum consistent with maintenance of long-term soil fertility.

3. Reduce flooding and improve drainage to extent needed to allow retention of the area for profitable agriculture in the future.

4. Install project measures in a manner which will minimize damage to fish and wildlife resources.

PLANNED PROJECT[1/]

Land Treatment

Land users will install land treatment measures in accordance with soil and water conservation plans developed in cooperation with the Calcasieu and the Gulf Coast Soil and Water Conservation Districts. The following will be accomplished in regard to the development of plans:

1. Thirty-one new conservation agreements will be signed by landowners who will become soil and water conservation district cooperators.

2. Thirty-three soil and water conservation plans will be developed with landowners who are now or will become soil and water conservation district cooperators.

3. Forty-eight conservation farm plans now in use will be updated.

These plans will be based on the proper use of soils within their capabilities and limitations. The capabilities and limitations of soils in specific locations will be determined by preparation and use of soil surveys.

Detailed soil surveys will be made on 83,100 acres of land in the watershed. Such surveys will be made by the Soil Conservation Service as part of the technical assistance provided to soil and water conservation districts. Soil scientists will make systematic borings and note the differences in texture, structure, color, and thickness of each distinct layer in the soils. The steepness of the slope will be measured, and an estimate of the amount of erosion which has taken place and the rate water will move through the soil will be made. On-the-spot chemical tests will provide an indication of the alkalinity or acidity of the soil. Once the soil type has been determined, it will be delineated on aerial photographs. When the field work is complete, the soil capability class (see page 21) will be determined for each soil. From this a determination will be made of the land treatment practices needed for the desired land use in order for the land to have adequate conservation treatment.

Land treatment measures necessary to adequately treat 19,650 acres consisting of 16,600 acres of cropland, 400 acres of pastureland, 2,500 acres of forest land, and 150 acres of other land will be

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[1/] All information and data, except as otherwise noted by reference to source, were collected or compiled during watershed planning investigation by the Soil Conservation Service and Forest Service, U. S. Department of Agriculture.

installed. Adequately treated land is land used within its capabilities and on which the proper conservation practices have been applied to compensate for its limitations. Providing necessary flood protection, drainage, and maintaining proper ground cover are the most important practices to consider in planning adequate treatment in this watershed. Such practices are needed to remove surface water at a rate that will permit healthy plant growth and minimize erosion. In addition to adequately treating 19,650 acres, conservation plans will be prepared and partial land treatment installed on 10,600 acres of cropland and about 400 acres of pastureland. The remaining 8,900 acres of cropland are presently adequately treated.

Present on-farm drainage systems fail to function at full capacity because of inadequate outlets. Improved drainage outlets provided through structural measures will allow application of land treatment measures.

Some of the major soil and water conservation practices to be installed and their functions are:

Land Treatment Measure	Function
Conservation Cropping System	Growing crops in a sequence that will provide adequate cover to protect the soil against erosion from heavy rainfall and produce high crop yields. Cropping system sequences vary according to needs of each field for protective soil cover. Cover and green manure crops together with cultural and management measures are included as needed for soil protection and improvement.
Crop Residue Management	Using plant residues on or near the soil surface of cultivated fields to provide cover during periods when the erosion hazard is critical. These residues reduce the impact of the raindrops when they strike the surface, thus reducing soil erosion and runoff. They also speed up water intake into the soil.
Drainage Mains and Laterals	Constructing open drainage ditches to designed size and grade to remove excess surface and subsurface water to improve the plant-growing environment.

Land Treatment Measure	Function
Land Smoothing	Removing irregularities on the land surface to provide a more uniform surface for irrigation water application, to improve surface drainage, to obtain uniform planting depths, to provide for more uniform cultivation, and improve equipment operation efficiency.
Pasture and Hayland Planting	Establishing or reestablishing grasses and legumes for the production of animal products and pasture to control erosion. After pastures are established, pasture and hayland management practices are used to maintain good plant cover.
Pasture and Hayland Management	Using fertilization, weed control and grazing practices to maintain a good, thick plant cover on the soil surface and produce high forage and livestock yields and control erosion.
Structures for Water Control (pipe drops)	Using structures where the force of flowing water is sufficient to cause gully erosion. These structures provide means for lowering the water from a higher elevation to a lower elevation in a short distance, as may be required where a lateral ditch joins a main ditch several feet deeper, without causing erosion damage and the resulting sediment.
Wildlife Wetland Habitat Management	Managing wildlife wetland habitat to provide food and cover for wildlife.
Wildlife Upland Habitat Management	Managing wildlife upland habitat to provide food and cover for wildlife.

Conservation measures to be planned and applied on cropland include conservation cropping systems, crop residue management, drainage mains and laterals, land smoothing, and structures for water control (pipe drops, appendix E, figure 3). Larger areas will be served by similar pipe drops installed as part of the structural measures. The treatment of pastureland will include pasture and hayland planting and management and other practices needed to provide adequate treatment.

PLANNED PROJECT

About 150 acres of "other" land will receive critical area treatment. This includes seeding of channel side slopes, berms, and spoil of on-farm mains and laterals.

The forest land will continue to receive fire protection under the Cooperative Forest Fire Control Program. The forest land treatment program includes reduction of wildfires through a contactor program, which will inform the public of the hazards of uncontrolled debris burning. An accelerated technical assistance program will identify the need and create treatment plans and management plans for 6,000 acres of forest land outside of industrial ownership. Management plans will be directed toward resource management for forest products, wildlife habitat, watershed protection, and environmental enhancement.

Wildlife wetland and upland habitat management consist of retaining and managing 1,250 acres of forest land for wildlife habitat. Technical assistance through the soil and water conservation district program will be furnished to private landowners in establishing plants for wildlife food and cover. The reduction in forest fires will result in 2,500 acres of forest land being adequately treated. Public fishing access to privately-owned farm ponds will be encouraged.

Land treatment measures will be installed during a 5-year period. Installation and maintenance of needed land treatment measures will continue after project installation.

Structural Measures

Structural measures in this plan are designed primarily to reduce flood damage and improve farm drainage. During installation full consideration will be given to the prevention of damages to fish and wildlife resources.

Structural measures consist of channel work which includes (1) excavation, (2) clearing, (3) structures for water control (weirs), and (4) structures for water control (pipe drops).

About 101 miles of existing channels were identified for study and then classified for type of channel and flow condition. Detailed surveys and analysis revealed that project-type work was necessary on 63 miles of these and no work was needed on the remainder. Of this 63 miles, 8 miles will be cleared and 55 miles will be enlarged. Most of the channels eliminated after study were in forested areas or have other environmental qualities from a habitat standpoint that outweigh beneficial effects of improving flow characteristics. Additionally, 10 miles of new channels will also be excavated. This 10 miles has no defined

channel at present. (See the coding system on page 10 for explanation of the type of channels, type of work, and flow condition.) The tabulation on page 11 exhibits types and lengths of channel work and the acres occupied before and after project installation.

Generally, land rights will be obtained by flowage easements with access provided to the Sponsors for construction, operation, and maintenance. The grantor will retain full ownership and control of his land.

Construction permits will probably be required by the U.S. Corps of Engineers (Engineering Regulation No. 1165-2-302). These permits will be obtained, as necessary, by the Sponsors prior to construction of the associated structural measures.

Of the total 73 miles of channels to receive work, about 63 miles (86 percent) have ephemeral flow and about 10 miles (14 percent) have intermittent flow. None of the work is on channels with perennial flow.

Of the 73 miles of channel work, 63 miles are manmade or previously modified channels and 10 miles are nonexisting or practically no defined channels.

Excavation will be done from only one side of the channels. Consideration will be given to leaving undisturbed the side providing the most shade during the summer months. These construction procedures are illustrated by the drawings on pages 12 and 13.

The 20 miles of channels in forest land and the 29 miles of channels having wooded banks adjacent to cropland are environmentally and aesthetically important. Efforts will be made to leave as many trees as requirements for construction and operation and maintenance will allow. Trees to be left inside the channel rights-of-way will be chosen on the basis of their size, form, color, leaf texture, bark, and flowering or fruiting characteristics.

Spoil from the channels will be stacked and smoothed in forest areas and spread, if desired by the farmer, in open areas. Openings will be left in the spoil which will allow natural drainage. Short recesses for sediment interception will be installed where needed at the junctions of principal laterals with the main channels.

As the channel work is being performed, berms will be maintained and spoil will be placed in a manner to allow maintenance equipment access to the channel. Where necessary, culverts will be placed in laterals entering channels so that continuity of access can be maintained. Where applicable, structures for water control (weirs and pipe drops) will be constructed in a manner that will allow maintenance equipment to cross over the channel. Figure 1 of appendix E shows a typical profile and cross section of a channel.

Construction of channels will be terminated before entering the Calcasieu River. These undisturbed areas will act as a filter for sediment.

Soil Conservation Service

Coding System for
Inventory of Channel Work

Type of Work

I - establishment of new channel including necessary stabilization measures

II - enlargement or realignment of existing channel or stream

III - cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation)

IV - clearing and removal of loose debris within channel section

V - stabilization, by continuous treatment or treatment of localized problem areas, as primary purpose (present capacity adequate)

VI - adequate

Type of Channel Prior to Project

N - an unmodified, well-defined natural channel or stream

M - manmade ditch or previously modified channel

O - none or practically no defined channel

Flow Condition Prior to Project

Pr - perennial - flows at all times except during extreme drought

I - intermittent - continuous flow through some seasons of the year but little or no flow through other seasons

E - ephemeral - flows only during periods of surface runoff

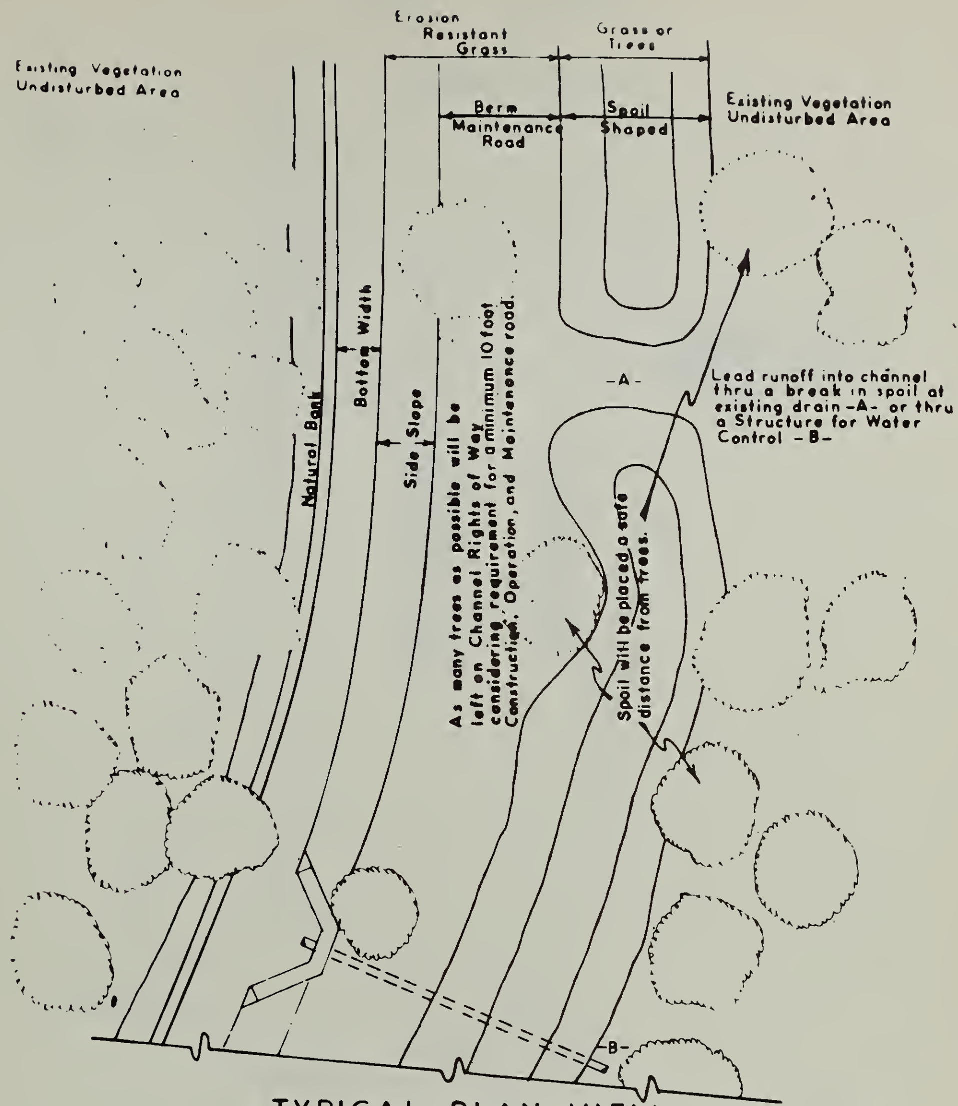
S - ponded water with no noticeable flow, caused by lack of outlet or high ground water level.

AREA OCCUPIED BY CHANNEL WORK

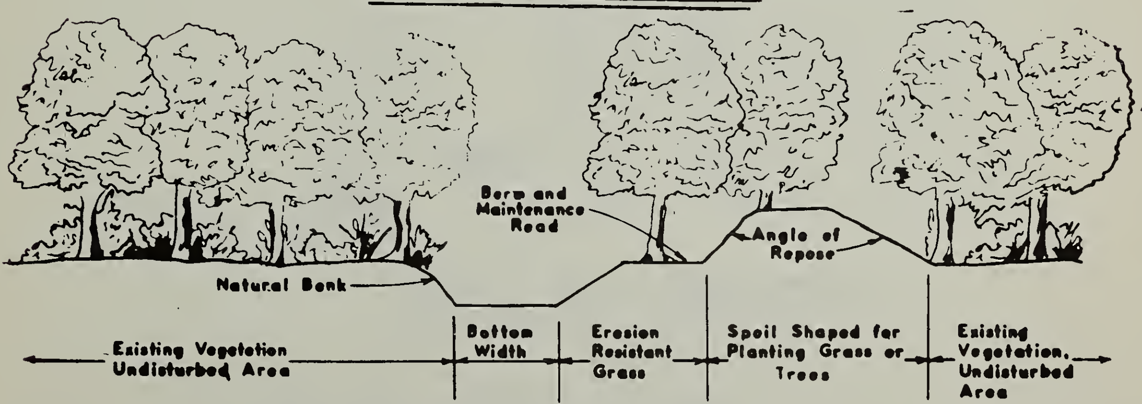
Channel Number	Excavation Length[b/] miles	Excavation Before : Right-of-Way -- acres --	Excavation After Right-of-Way -- acres --	Clear Only Length[b/] miles	Clear Only Before : Right-of-Way -- acres --	Clear Only After Right-of-Way -- acres --
M-1	8.96	71.2	143.2	1.23	14.3	18.7
L-1A	2.29	5.8	26.4	0	0	0
L-1B	2.33	7.0	20.0	0	0	0
L-1C	.95	2.1	7.8	0	0	0
L-1D	3.14	15.7	38.1	0	0	0
L-1D-1	.34	2.3	3.3	.19	1.6	2.3
L-1D-2	.38	.6	3.0	0	0	0
L-1E	1.34	3.6	12.7	0	0	0
L-1F	1.61	11.3	22.1	0	0	0
L-1F-1	.31	.9	2.7	0	0	0
L-1G	1.12	4.2	10.7	0	0	0
M-2	4.38	35.8	59.7	3.22	34.3	39.0
L-2B	1.22	7.2	11.2	.55	2.9	6.5
L-2C	2.21	12.3	20.0	0	0	0
L-2D[a/]	1.76	6.1	8.5	1.55	9.4	11.3
L-2D-1[a/]	.27	3.5	5.4	0	0	0
L-2E[a/]	.64	8.4	13.1	0	0	0
L-2E-1[a/]	.66	6.2	8.2	0	0	0
M-3	.91	2.3	6.4	0	0	0
M-4	.36	.9	2.7	0	0	0
M-5	8.45	18.9	93.5	.66	5.9	10.0
L-5A	5.39	21.2	68.5	.58	3.5	12.1
L-5A-1[a/]	2.20	7.6	17.3	0	0	0
L-5A-2[a/]	1.57	1.0	12.4	0	0	0
L-5A-3[a/]	.72	2.2	5.7	0	0	0
L-5B	4.36	30.5	49.6	0	0	0
L-5B-1[a/]	.89	2.7	7.0	0	0	0
M-6	2.61	11.2	29.0	0	0	0
L-6B	.72	0	6.6	0	0	0
M-7	2.13	5.1	20.9	0	0	0
L-7A	.57	.5	4.2	0	0	0
Total	64.79	308.3	739.9	7.98	71.9	99.9

[a/] Estimated

[b/] See appendix H for inventory of channel work by reaches



TYPICAL PLAN VIEW

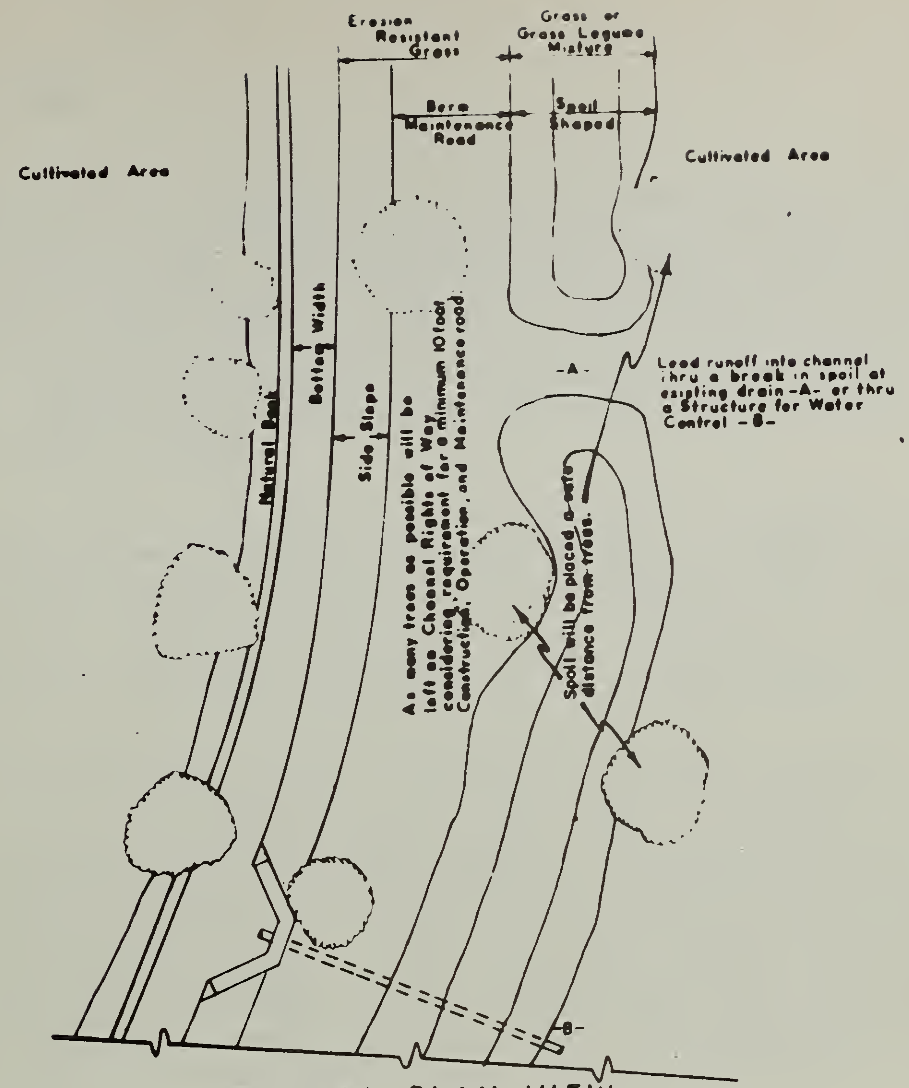


TYPICAL CROSS SECTION

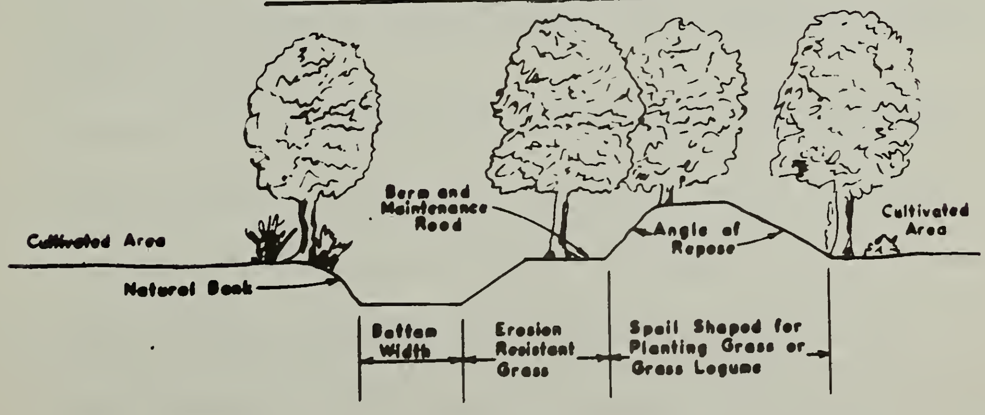
KINDER WATERSHED

ALLEN AND JEFFERSON DAVIS PARISHES, LA.

TYPICAL PLAN VIEW AND CROSS SECTION OF CHANNELS THROUGH FOREST LAND



TYPICAL PLAN VIEW



TYPICAL CROSS SECTION

KINDER WATERSHED

ALLEN AND JEFFERSON DAVIS PARISHES, LA.

TYPICAL PLAN VIEW AND CROSS SECTION OF CHANNEL WHERE WOODY VEGETATION EXISTS ADJACENT TO CULTIVATED AREA

PLANNED PROJECT

Channel M-2 was designed so as to preserve a Type 1 wetland area near the outlet. The channel will carry the runoff from the wetland and the open land upstream. The forested nature of the wetland and an absence of internal drainage cause the runoff from the wetland to be considerably less than the runoff from an equal area of open land. Because of these factors, flooding from direct precipitation on the wetland will not be affected. However, the channel work will reduce the overbank flooding on low intensity storms.

Channels M-1, L-1F, and L-1F1 were designed to provide a 3-year level of protection from overbank flooding in Kinder. Although urban protection is not a formal project objective, project channels which serve as outlets for town storm drainage systems will be made adequate to accommodate these systems. The town of Kinder has made plans to enlarge its storm sewer system to eliminate flooding from the 3-year frequency storm.

Six structures for water control (weirs) shown as figure 2 of appendix E will be installed at strategic points in channels to (1) minimize possible damages to fishery habitat, (2) reduce downstream sediment following construction, (3) reduce growth of vegetation on the channel bottom during dry season, (4) help preserve existing water supplies necessary to maintain agricultural production, and (5) maintain aesthetics of the landscape. These structures will be installed prior to any work being performed on the upstream end of the involved channels and their involved laterals and will create approximately 11 miles (36 surface acres) of water. Their approximate locations are:

1. In the vicinity of State Highway 383 crossing on Channel M-1 near the outlet.

2. Approximately 2 miles from the outlet end of Channel M-1.

3. Approximately 6 miles from the outlet end of Channel M-1.

4. Approximately 0.8 mile above the parish line on Channel M-2.

5. About 3 miles from the outlet end of Channel M-5.

6. Approximately 1 mile from the outlet end of lateral channel L-5A.

The following data summarizes the preproject and postproject conditions for fisheries habitat that is affected by construction:

	Miles	Flow Condition	Acres	Standing Crop	Total Pounds
Preproject	10.0	Intermittent	24	15 lbs/ac	360
Postproject	11.0	Ponded water	36	15 lbs/ac	540
Postproject	2.3	Intermittent	6	15 lbs/ac	90

In addition to fisheries benefits, the structures will provide habitat for wading birds and permanent watering areas for many game and nongame species of birds and other animals. For additional benefits, see the discussion under the Structural Measures section.

Figure 3 of appendix E shows a typical structure for water control (pipe drop). These structures will be installed to prevent erosion and thus protect the channel from excessive sedimentation, reduce maintenance cost, and insure proper functioning of the channels. They are considered appurtenant measures to channel work.

All channel slopes will be seeded immediately after construction. Berms will be seeded immediately after construction traffic ends. Spoil on open land will be spread in some cases. Spoil in forest land will be stacked, shaped, and seeded. Depending upon soil type and season of the year, species such as the following can be used: Common bermudagrass, Pensacola bahiagrass, lespedezas, Browntop millet, ryegrass, and fescue. When annual plants are used in the initial seedings, perennial plants will be over seeded at the proper season.

Approximately 40 acres of rights-of-way through forest land will be planted to hardwood seedlings. Species such as water oak, willow oak, sawtooth oak, and pecan will be used depending on soil types and availability. Vegetative cover will be established on the remaining 43 acres in forest land and natural plant succession allowed to occur. The environmentally and aesthetically important trees to be left during construction together with the plantings will provide "full stocking" for the entire rights-of-way.

Alterations, modifications, or reconstruction of some existing facilities will be necessary to insure proper functioning of planned structural measures. These include, but are not limited to, replacing or changing 1 bridge and 7 culverts on State and Federal highways, 17 bridges and 31 culverts on parish and private roads, pipelines at 14 locations, and utility lines and fences at about 215 locations. All bridge and culvert changes will be coordinated with responsible agencies at the construction design stage. This will insure compliance with their standards and specifications. Structural measure installations are expected to be completed in a 3-year period.

The disposal of all clearing wastes and construction debris will be accomplished by burying, burning, or removal from the construction site. All burning will be conducted in accordance with the Louisiana Air Control Commission regulations and other applicable laws governing such operations. Noise levels will be monitored by the Soil Conservation Service and standards set by the Occupational Safety and Health Act will be followed.

PLANNED PROJECT

There are no properties listed in the National Register of Historic Places that will be affected by the installation of structural measures. Should any archaeological or historical sites be discovered during the installation of structural measures, construction will be stopped. The Secretary of the Interior (National Park Service), the Curator of Anthropology, and the Historical Preservation Officer will be notified, and will be given an opportunity to evaluate and make recommendations for salvage or mitigation before construction continues. Also, the Advisory Council on Historic Preservation will be afforded an opportunity to comment in accordance with the "Procedures for the protection of Historic and Cultural Properties."

The State Historic Preservation Officer's letter dated January 9, 1975 states that his department does not know of any sites on the National Register of Historic Places or being actively nominated to the National Register which would be effected by this proposed project.

Two National Champion Big Trees exist in this watershed. These have been located and the Louisiana Forestry Commission will work with landowners in preserving them.

An itemized summary of the design features which were included to minimize adverse impacts on fish and wildlife habitat is:

1. Eliminate excavation in forest land habitat at all points where flow characteristics can be sufficiently improved by any other method.

2. Limit excavation required in forest land to the side of the channel with the poorest quality habitat.

3. Limit excavation (in channels where high summer temperatures are a factor) to the side with the poorest bank cover.

4. Terminate excavation on channels in advance of their confluence with Calcasieu River.

5. Vegetate disturbed areas with plants beneficial to game and nongame species.

6. Install structures for water control (weirs) to minimize damages to the fisheries in intermittent and ephemeral flow channels.

Land Use Changes

Land use changes resulting from project installation will be limited to rights-of-way areas and are summarized on the following page.

PLANNED PROJECT

FUTURE WITHOUT PROJECT		FUTURE WITH PROJECT	
Land Use	Acreage in Channel R.O.W.	Land Use	Acreage in Channel R.O.W.
Open land	98	Open land	248
Forest land	114	Forest land	237
Wooded channel banks	169	Wooded channel banks	356
TOTAL	381	TOTAL	841

Operation and Maintenance

Operation and maintenance of all phases of the completed project will be the responsibility of the Sponsors. The Calcasieu and the Gulf Coast Soil and Water Conservation Districts, obtaining help from available sources and working with individual landowners and operators, will have the responsibility for maintaining land treatment measures. The Louisiana Forestry Commission, in cooperation with the U. S. Forest Service, will furnish technical assistance necessary for maintaining forest land treatment measures under the going Cooperative Forest Management Program. The Federal-State Cooperative Fire Control Program will continue to furnish fire protection for the watershed area. The Calcasieu and the Gulf Coast Soil and Water Conservation Districts with technical assistance from the Soil Conservation Service will assist and encourage landowners to maintain land treatment measures. The objectives will be to maintain adequate drains, ground cover, and other practices which will protect and conserve soil and water resources.

Operation and maintenance of all phases of the completed structural measures will be the responsibility of the Kinder Drainage District No. 2 and the Jefferson Davis Parish Consolidated Gravity Drainage District No. 1. In addition to maintaining the structural measures proposed in the plan, the district will continue to maintain channels that are now adequate, as indicated on the Project Map, Appendix C. The methodical operation and maintenance of structural measures will insure proper functioning of these measures and realization of effects.

The present 4-mill maintenance tax for drainage is considered adequate for maintaining channels and associated works. If these funds should prove inadequate, additional financing provided through normal funding procedures such as bond issues or taxes will be used to provide funds. Annual expenses, including the replacement and regular operation and maintenance, are estimated to be $27,390. Channel maintenance includes such activities as periodic cleanouts necessary to restore

channels to their planned capacities, patching of eroded areas or washouts on channel banks, control of aquatic weeds that would reduce channel capacities, and repair or replacement of side inlets and other structures. Maintenance of structures for water control (weirs and pipe drops) includes repairing rills around headwalls or wingwalls, replacing of rock riprap as needed, maintaining or replacing vegetation on fills, repairing or replacing worn or broken parts, replacing short life parts and all other activities essential to the safety and functioning of the structure. Maintenance and improvement of the general attractiveness or beauty of the channel and structure sites shall be considered an important feature of the maintenance program.

Existing public roads, farm roads, turn rows, trails, open areas, and other existing facilities will be used for maintenance equipment to reach the channels. If none are existing, travel ways will be provided. The channels will be kept clear of excessive vegetation by mowing, hand labor, and use of approved herbicides. Herbicides such as ammonium sulfamate, bromacil, and others registered with the Environmental Protection Agency (EPA) and approved by the United States Department of Agriculture (USDA) will be applied in a manner consistent with their labeling. Copper sulfate and cutrine will be used to control algae before excessive "blooms" develop in areas upstream from the six structures for water control (weirs). Pesticides presently approved will not preclude the use of other EPA registered and USDA approved pesticides developed during the life of the project. Spraying will be accomplished in the summer months when the channels are most likely to have the least flow. Spraying during these months will also lower the possibility of runoff carrying herbicides into other areas. Structures for water control (weirs and pipe drops) will be repaired when in need. Two mechanical cleanouts are anticipated during the life of the project. The amount of sediment to be removed each time will be small enough to be placed and smoothed on the berm.

Special operation and maintenance procedures are required for Channel M-7 in the vicinity of the colony of red-cockaded woodpeckers. No mechanical maintenance equipment is to be used within approximately 500 yards of the nesting area.

The effective area of flow of Channel M-7 in the vicinity of the woodpecker colony is a broad valley with a small pilot channel in the bottom. Its present land use is forest and range for a few cattle. As a result of this use and forestry management that has occurred in the past, the trees are sparse with very little woody understory vegetation present. As long as there is no land use change in the area of flow described, very little or no need for maintenance is anticipated.

PLANNED PROJECT

Provisions will be made for representatives of the Soil Conservation Service, the Louisiana Department of Public Works, and the local Sponsors to have free access to all portions of the works of improvement at any reasonable time for the purpose of inspection, repair, and maintenance. The local Sponsors, together with representatives of the Soil Conservation Service, will make a joint inspection annually, after severe storms, and after the occurrence of any other unusual condition that might adversely affect the structural measures.

Joint inspections will continue for 3 years following completion of installation of the structural measures. Inspections after the third year will be made by the Sponsors. They will prepare an annual report and send a copy to the Soil Conservation Service. Items of inspection will include, but will not be limited to, conditions of vegetative cover and growth, need for removal of sediment bars and debris accumulations, and brush control in channels and general condition.

The Sponsoring Local Organization fully understands its obligations for operation and maintenance and will execute a specific operation and maintenance agreement with the Soil Conservation Service prior to the execution of the project agreement for the installation of works of improvement. The method in which operation and maintenance is to be accomplished will be in accordance with procedures outlined in the Soil Conservation Service Operation and Maintenance handbook for Louisiana.

Project Costs

The total installation cost of the project is estimated to be \$2,866,500 of which \$944,100 is for land treatment measures and \$1,922,400 is for structural measures. Of the total \$2,866,500, \$1,177,200 will be borne by Public Law 566 funds and \$1,689,300 by other funds. The total construction cost of structural measures is \$1,050,400 of which \$787,800 will be borne by Public Law 566 funds and \$262,600 by other funds. For more information on costs, see tables 1, 2, 2A, and 2B of the Kinder Watershed Work Plan.

ENVIRONMENTAL SETTING

Physical Resources

The Kinder Watershed is in southwest Louisiana. It encompasses approximately 84,000 acres of which 75,600 acres are in south-central Allen Parish and 8,400 acres are in northeastern Jefferson Davis Parish.

Kinder (population 2,300) is the only town in the watershed. It is located at the intersection of U.S. Highways 165 and 190. Elton, a small town with a population of approximately 1,600, is about 2 miles east of the watershed along U.S. Highway 190. Oberlin, the Allen Parish seat, and Oakdale, the largest town in the parish, are located about 1 mile and 16 miles, respectively, northeast of the watershed boundary along U.S. Highway 165. Lake Charles, the fourth largest city in the State, is located 35 miles to the southwest of the watershed boundary along U.S. Highway 90 and Interstate Highway 10.

The watershed is in the Calcasieu River subregion of the Lower Mississippi Region.[1/] It is fairly typical of other flatland watersheds in the subregion.

The west side of the watershed has gentle slopes that become level and nearly level in the eastern and southern portions. About 65 percent of the watershed is in the Gulf Coast Prairie Land Resource Area. The remaining 35 percent is in the Southern Coastal Plain Land Resource Area. Elevations range from 30 to 90 feet above mean sea level in the Southern Coastal Plain and from 30 to 50 feet above mean sea level in the Gulf Coast Prairie Land Resource Areas.[2/] The original cover was dense, pine-hardwood forest in the Southern Coastal Plain and tall grass and scattered brush in the Gulf Coast Prairie.

As a basis for conservation planning, the soils of the watershed are grouped in accord with the soil capability classification system. Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops.

[1/] U. S. Department of Agriculture, Soil Conservation Service, Atlas of River Basins of the United States, 2nd ed. (Washington: U.S. Government Printing Office, 1970) Map No. 15.

[2/] U. S. Department of Agriculture, Soil Conservation Service, Land Resource Regions and Major Land Resource Areas of the United States, Agriculture Handbook No. 296 (Washington: U.S. Government Printing Office, 1965), p. 69.

Capability Classes, the broadest group, are designated by Roman numerals I through VIII. In Class I are soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In Class VIII are soils and landforms so rough, so shallow, or otherwise so limited that they do not produce worthwhile yields of crops, forage, or wood products. Classes I, II, and III are suitable for cropland, Class IV is marginal for cropland, and Classes V-VIII are unsuited for cropland.[3/]

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, "e" or "w," to the class numeral, for example, IIw. The letter "e" shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; "w" shows that water in or on the soil interferes with plant growth or cultivation.[4/]

The principal soil associations are Acadia-Wrightsville, Crowley-Mowata, and Caddo-Beauregard. Bibb-Mantachie and Bowie-Ruston are present, but to a lesser extent.[5/] See general soil map on the following page.

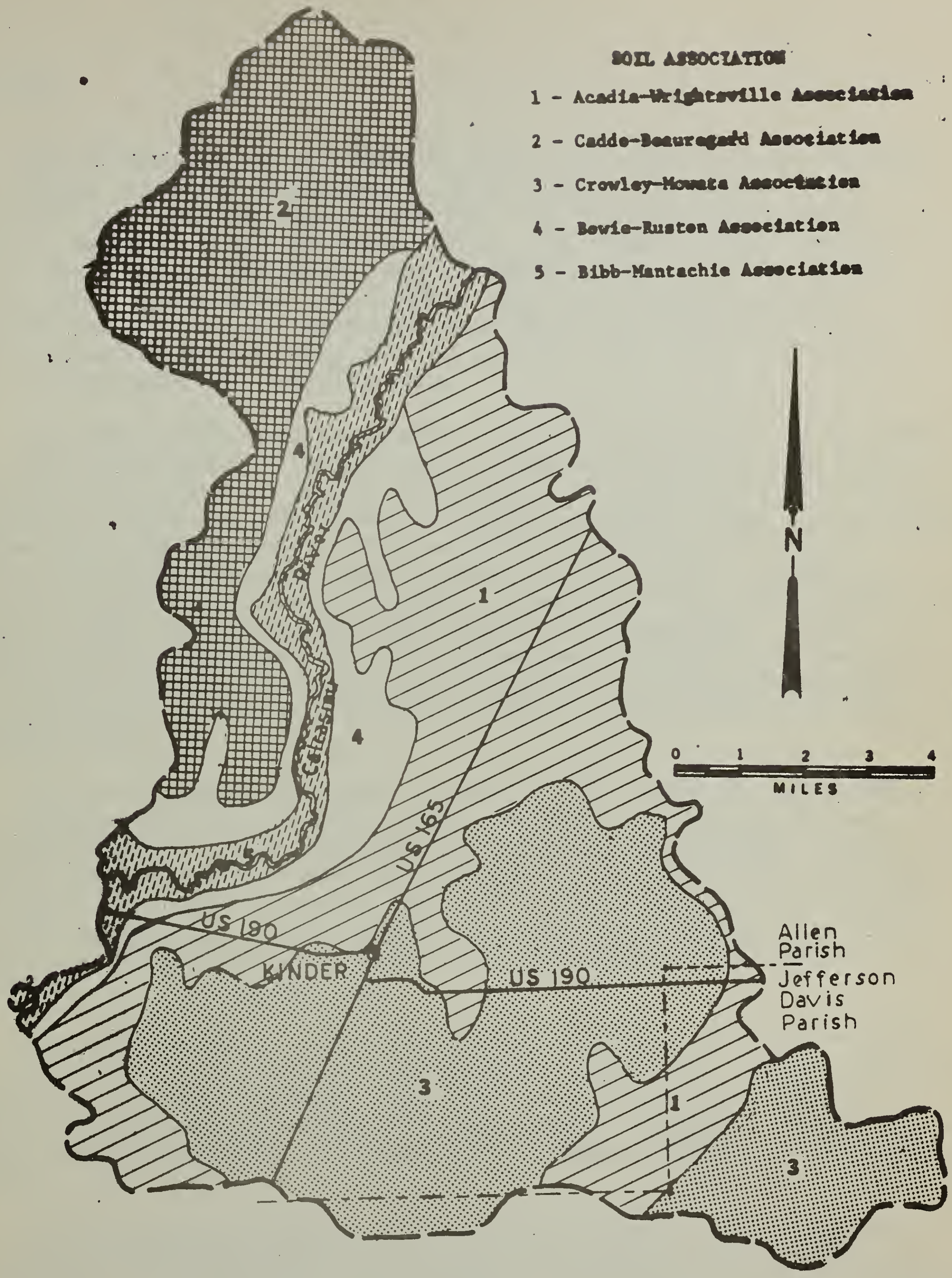
The Acadia-Wrightsville Association, covering about 30 percent of the watershed, is composed of level to very gently sloping, upland soils. They have a silty loam surface layer and clayey subsoils. Acadia soils are somewhat poorly drained and are nearly level to gently sloping. The poorly-drained Wrightsville soils occur on the broad flats and depressed areas. Most of these soils are in Capability Class IIIw. Both of these soils have low fertility, but if properly drained and fertilized, will produce high crop yields. The Acadia and Wrightsville soils have forest-land site indices[6/] of 86 and 80, respectively, for loblolly pine.

[3/] U.S. Department of Agriculture, Soil Conservation Service, Land Capability Classification, Agriculture Handbook No. 210 (Washington: U.S. Government Printing Office, 1961) pp. 6-10.

[4/] *Ibid.*, pp. 10-11.

[5/] U.S. Department of Agriculture, Soil Conservation Service, Allen Parish" and "Jefferson Davis Parish," General Soil Map (Fort Worth: Cartographic Unit, South Regional Technical Service Center, 1971).

[6/] Forest land site index is the height in feet of the tallest trees (dominants and codominants) in normal stands at 50 years of age.



General Soil Map
Kinder Watershed
Allen and Jefferson Davis Parishes, Louisiana
U. S. Department of Agriculture
Soil Conservation Service
Alexandria, Louisiana

Compiled from SCS General Soil Maps of
Allen and Jefferson Davis Parishes

April 1974

SETTING

The Crowley-Mowata Association, about 34 percent of the watershed, is composed of level to depressed, upland soils. They have a silt loam surface layer and clayey subsoils. The somewhat poorly-drained Crowley soils are level or nearly level. The poorly-drained Mowata soils are level or depressed. Most of these soils are in Capability Class IIIw. These soils will produce high crop yields if properly drained and fertilized. Although the Crowley and Mowata soils are seldom used for forest, they have forest-land site indices of 90 and 87, respectively, for loblolly pine.

The Caddo-Beauregard Association, about 19 percent of the watershed, is composed of level to very gently sloping, upland soils. The poorly-drained Caddo soils are level or depressed. The moderately well-drained Beauregard soils are nearly level or gently sloping. Caddo and Beauregard soils are loamy throughout. Most soils in the association are in Capability Class IIIw with lesser amounts of IIw or IIe. Capability Class IIw and IIe soils make up about 24 percent of the association. Soils of this association are used mostly for forest land. Crops grown on Caddo soils have poor to fair response to fertilizers while on Beauregard soils they have a fair response. Caddo and Beauregard soils have forest-land site indices of 90 and 92, respectively, for loblolly pine.

The Bowie-Ruston Association, about 10 percent of the watershed, is composed of gently sloping, upland soils that are moderately well to well drained. Capability Class IIIe and IIe are dominant. These soils have low fertility and erode easily if used for cultivated crops. However, crops respond well to fertilizers and erosion can be reduced by good management. Forest is the main land use on these soils. The Bowie and Ruston soils have forest-land site indices of 83 and 91, respectively, for loblolly pine.

The Bibb-Mantachie Association, about 7 percent of the watershed, is composed of level soils of the Calcasieu River flood plain. They are subject to frequent flooding. The soils are in Capability Class Vw. They are loamy throughout and have poor natural drainage. Because of severe flooding and poor drainage, most of these soils are in forest land.

The Montgomery Terrace and the Prairie Terrace (two Pleistocene Formations) and recent flood-plain deposits constitute the formations located at the surface.[7/] The Montgomery Formation is located primarily in the area west of the Calcasieu River, while the Prairie Formation

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[7/] Rufus J. LeBlanc, Geologic Map of Louisiana (a map compiled from several sources of data, Baton Rouge, Louisiana, 1948).

is located to the east of the river and in a narrow belt west of the river. Recent deposits are found in the flood plain of the river.

Soils of the older Montgomery Formation generally show less clay in the surface and upper subsoil than the soils of the Prairie Formation. The slope of the Montgomery Terrace is generally about 3 feet per mile, while the Prairie usually has a slope of about 2 feet per mile.

The average annual rainfall is about 60 inches with approximately 28 inches occurring during the growing season (April to September). The rainfall is usually well distributed throughout the year, but heavy rainfall may occur at any time. Mean temperatures range from 83 degrees Fahrenheit in July to 53 degrees in January.[8]

Oil and gas are the only mineral resources of the watershed area. The largest and oldest producing field in Allen Parish is located east of the watershed. The first well was completed in 1939. Since that time, 15 other fields have been discovered in the parish. Of the 15 fields, 4 and a portion of another are located in the watershed. Production is from the Catahoula and Wilcox Formations. No commercial clay or gravel deposits are known to exist in the watershed area.

Ground water is obtained from the Chicot Aquifer of the Pleistocene Age and the Evangeline Aquifer of Pliocene Age. The town of Kinder obtains its water from three wells, two of which produce from the Evangeline Aquifer and one from the Chicot Aquifer. The following tabulation illustrates the chemical analysis of water from the Chicot Aquifer:

Chemical Analyses of Water from Wells at Kinder, La.
(Results in parts per million except as indicated)

Well A1-154

Silica (SiO_2)	56	Dissolved solids:	
Iron[a] (Fe)	1.5	Calculated (Sum)	151
Iron[b] (Fe)	11.5	Hardness as $CaCO_3$	32
Calcium (Ca)	7.2	Specific conductance	
Magnesium (Mg)	3.4	(micromhos at 25°C)	180
Sodium (Na)	26	pH (Lab.)	7.6
Bicarbonate (HCO_3)	64	Temperature (°F)	72
Carbonate (CO_3)	0		
Sulfate (SO_4)	3.0		
Chloride (Cl)	24		
Fluoride (F)	.0		
Nitrate (NO_3)	.0		

[a] In solution at time of analysis.
[b] Total amount of iron in sample; presumably in solution when collected.

Source: J. L. Snider, M. D. Winner, Jr., and J. B. Epstein, Ground Water for Louisiana, Public Supplies (Baton Rouge, Louisiana: Louisiana Department of Public Works, 1962), p. 17.

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[8] U. S. Department of Agriculture, Forest Service, A Forest Atlas of the South (Southern Forest Experiment Station, New Orleans, Louisiana, and Southeastern Forest Experiment Station, Asheville, North Carolina, 1969), pp. 22-23.

SETTING

The watershed is part of the recharge area for the Chicot Aquifer. The Calcasieu River is a prime recharge system in this area. Approximately 50 percent of the recharge area has less than 50 feet of clay overlying the aquifer and the remainder of the area has between 50 and 100 feet of clay. Because of this clay overlay, shallow channels do not contribute significantly to the recharge of the aquifer.

Water for livestock and domestic use in the rural area is supplied by shallow wells, ditches, irrigation canals, farm ponds, and in some instances, by deep wells. The primary source of water for urban and irrigation use is deep wells. A small amount of rice is irrigated by pumping from surface storage in Calcasieu River.

The present land use and percent distribution is as follows:

Land Use	Acres	Percent
Cropland	35,700	43
Pastureland	1,200	1
Forest land	38,850	46
Other[a]	8,250	10
TOTAL	84,000	100

[a] Includes roads, railroads, channels, rivers, communities, farmsteads, rights-of-way, etc.

The acreage involved in the cropland and pastureland is located in the southern one-third of the project area with lesser amounts scattered in the middle one-third of the area. Small interspersed forest land tracts are also located in the water problem area.

The forest land is located primarily in the northern one-third of the project area and along the flood plain of the Calcasieu River. The lower picture on page 27 shows typical forest along the Calcasieu River. The three plant communities in the forest land are (1) bottom land hardwoods, (2) mixed pine-hardwoods, and (3) planted pine. The description of the vegetation associated with the different plant communities is found in the Plant and Animal Resources section.

Basal area ranges from 50 to 170 square feet per acre with an average of about 80 in the industrial and leased forest lands. Basal area is defined as the area of a tree expressed in square feet at 4.5 feet above ground. Site index ranges from 80 to 100 feet, giving these lands the potential to grow from 300 to 500 board feet of wood per acre per year. Most of the forest land is currently growing 150 board feet per acre per year.

SETTING

The drainage outlet for the watershed is the Calcasieu River. The upper picture on page 27 shows the river at the U. S. Highway 190 Bridge. The river flows in a southwesterly direction. The general drainage pattern for channels east of the Calcasieu River is south and then west. The channels west of the Calcasieu River generally drain in a southeasterly direction.

The drainage system consisted of a pattern of bayous and natural depressions before the area was settled by the pioneers. As the cultivation of crops was undertaken, a drainage improvement program was initiated which included installing manmade "ditches" and enlarging and clearing many of the natural water courses. Most of the channels that comprise the present system of outlets have been dug, in most cases, more than once. The geometric configuration and alignment of these natural depressions have been altered. Cleaning of these ditches for the past 50 years has resulted in the present outlet system of manmade "drainage ditches." The photographs on page 28 show two typical "drainage ditches."

The principal channels with their laterals and other smaller channels were divided into six groups for inventory purposes. These are:

Group	Channels Included
I	Channel M-1 and its laterals
II	Channels M-3 and M-4
III	Channel M-2 and its laterals
IV	Channels M-5 and M-6 and their laterals
V	Channel M-7 and its lateral
Other	All remaining channels

Stream classification excluding the Calcasieu River shows that there are about 19 miles of channels which are classified as unmodified, well-defined, natural streams. These occur in forest areas near the Calcasieu River and near or in its flood plain. Of the remaining miles of channels, there are about 72 which are classified as manmade or previously modified and about 10 miles which are classified as nonexistent or practically undefined. Of the 91 miles of existing channels, adequate portions included, 74 have ephemeral flows and 17 have intermittent flows. The only perennial stream is the outlet, Calcasieu River.

There are 25 ponds in the watershed. Twelve are multi-purpose and comprise a total of 40 acres. Thirteen are devoted to commercial catfish production and comprise a total of 23 acres.

The Louisiana Stream Control Commission has described portions of interstate streams, coastal waters, and streams discharging into coastal waters in the State according to present use. The Commission has also

Calcasieu River at U.S. Highway No. 190 Bridge

Typical Flood-Plain Forest Land of the Calcasieu River

Natural Depression which has been Dug and is
Referred to Locally as a "Drainage Ditch"

Manmade "Drainage Ditch"

established quality standards which will apply to these streams and their intrastate navigable tributaries and water bodies. Calcasieu River is the only stream classified by the Commission which is applicable to this watershed. The complexity of this aquatic ecosystem has resulted in the Commission's dividing the river into three zones. Zone 1 is applicable to this watershed project and is defined as that portion of the river from its origin to Calcasieu River saltwater barrier. The saltwater barrier is located about 30 miles south of the watershed boundary. The present uses of Calcasieu River in Zone 1 according to the Commission are: "Industrial supply, primarily cooling water in the Lake Charles area, propagation of aquatic life for commercial and sport fishing, irrigation water for considerable acreage of rice, recreational use, including water contact sports, carriage of municipal and industrial wastes." The anticipated future uses according to the Commission are: "Municipal water supply in upper reaches, carriage of treated municipal and industrial wastes, and increased use for industrial supply." General criteria for water quality standards established by the Commission state: "No discharge to Zone 1 shall result in conditions in the stream which will adversely affect the public health or use of the water for municipal and industrial supplies, recreation, propagation of aquatic life and other legitimate uses."

The following are specific criteria:[9/]

pH	Within the range of 6.0 - 8.5.
Dissolved Oxygen	Not less than 50 percent of saturation at existing water temperature.
Temperature	Not to be raised more than 3 degrees centigrade above normal ambient water temperature, nor to exceed a maximum of 36 degrees centigrade.
Oils	There shall be no slicks of free or floating oil present in sufficient quantities to interfere with the designated uses, nor shall emulsified oils be present in sufficient quantities to interfere with the designated uses.

[9/] State of Louisiana, Louisiana Stream Control Commission, Water Quality Criteria and Plan for Implementation (Unpublished report, 1968), p. 37.

SETTING

Toxic Materials	None present in quantities that alone or in combination will be toxic to animal or plant life. In all cases the level shall not exceed the TLM 48/10.[a]
Foaming or Frothing Materials	None of a persistent nature.
Coliforms (MPN[b]/100 ml)	The monthly median shall not exceed 1600/100 ml, nor shall this count exceed 5420/100 ml in more than 10 percent of the samples in any one month.
Other Materials	Limits on other substances not heretofore specified shall be in accordance with recommendations set by the Louisiana Stream Control Commission and/or by the Louisiana State Board of Health for municipal raw water sources.

a/ Median Tolerance Limits

b/ Most Probable Number

The Division of Water Pollution Control of the Louisiana Wild Life and Fisheries Commission has monitored water quality in Calcasieu River for several years. Water samples used in these tests were obtained monthly at the U.S. Highway 190 Bridge crossing about 4 miles west of Kinder. Data collected show that the water quality is within the ranges established by the specific criteria. The tabulation on the following page shows the results of 8 years of monitoring the water quality.

A total of 820 acres of wetlands as defined in USDI Circular No. 39 occurs in the watershed.[10] Type 1 wetlands total 755 acres and Type 5 wetlands total 65 acres. The majority of these wetlands are found in the flood plain of the Calcasieu River.

Type	Description	Acres
1	Seasonally flooded hardwoods	755
5	Open lakes and ponds up to 10 feet deep	65
	Total	820

10/ U.S. Department of the Interior, Fish and Wildlife Service, Wetlands of the United States, Circular No. 39 (Washington: U.S. Government Printing Office, 1956), pp. 20-22.

Water Quality Data - Calcasieu River Below U. S. 190 Bridge[a/]

Year		pH (UNITS)	Diss. Oxygen (PPM)	Oxygen Saturation (PERCENT)	Temp. °C	Turbidity (UNITS)	True Color (UNITS)	Susp. Solids (PPM)	Diss. Solids (PPM)	Total Solids (PPM)	Specific Conductance (UMHOS/CM²)	Total Hardness (PPM)	Total Alkal. (PPM)	Sulfates (PPM)	Chlorides (PPM)	Sodium (PPM)
1973	Mean	6.9	6.8	71	19	22	63	23	94	117	50	16	25	5	10	7
	Maximum	8.7 Sp[b/]	8.5 W	80 Sp	26 S	50 F	80 W	124 F	468 Sp	470 Sp	90 S	23 Sp	64 Sp	13 W	50 S	30 S
	Minimum	6.0 W	5.0 S	60 S	9 W	10	40 F	2 W	10 W	12 W	20 W	6 F	9 W	0 Sp	3 S	0 Sp
1972	Mean	7.0	7.2	76	19	25	63	26	475	501	54	18	38	10	13	9
	Maximum	7.5 Sp	8.8 W	91 S	27 F	45 W	160 F	54 W	3068 F	3070 F	120 F	47 Sp	96 Sp	15 W	38 F	24 Sp
	Minimum	6.3 W	6.3 S	62 W	5 W	10 F	5 S	2 F	36 Sp	56 F	30 Sp	6 F	8 W	6 F	4 S	0 Sp
1971	Mean	7.0	7.0	71	17	20	66	29	71	100	78	21	35	17	9	8
	Maximum	7.5 F	9.2 W	87 W	25 S	35 Sp	100 W	116 W	169 F	187 F	90 S	42 F	62 F	30 Sp	14 W	17 S
	Minimum	6.3 Sp	2.7 Sp	27 Sp	9 W	5 F	30 F	1 F	0 W	32 W	60 W	14 W	21 Sp	7 F	7 F	1 F
1970	Mean	6.6	7.8	80	18	33	49	17	92	109	165	15	23	13	10	11
	Maximum	7.3 F	11.4 W	87 S	30 S	46 F	80 F	38 F	170 S	180 S	620 F	32 W	31 S	37 S	41 Sp	35 Sp
	Minimum	6.0 W	6.2 S	65 F	4 W	30 S	30 S	2 S	38 Sp	66 S	50 Sp	11 F	9 W	6 S	4 Sp	3 Sp
1969	Mean	6.7	8.0	82	18	32	42	19	97	116	113	29	26	7	10	15
	Maximum	8.0 F	11.1 W	96 W	28 S	50 Sp	100 Sp	74 Sp	224 S	246 S	250 Sp	186 F	117 F	11 W	21 F	46 S
	Minimum	5.8 W	5.8 S	73 S	8 W	30 F	20 F	0 F	22 Sp	42 Sp	43 Sp	12 Sp	8 W	3 F	4 Sp	4 Sp
1968	Mean	6.9	7.5	76	17	30	40	24	111	135	113	15	17	9	6	9
	Maximum	7.6 S	9.8 W	86 F	27 S	32 W	70 Sp	94 W	382 S	404 S	145 S	25 F	31 F	14 F	8 F	28 F
	Minimum	6.0 W	5.6 F	64 Sp	4 W	30 Sp	10 F	0 Sp	46 W	74 W	72 W	10 Sp	6 W	6 F	3 W	1 W
1967	Mean	6.8	7.9	80	17	39	38	26	95	121	134	20	27	16	7	10
	Maximum	8.1 W	9.7 W	90 W	28 S	75 S	60 Sp	70 Sp	178 S	188 S	206 S	38 S	48 W	93 F	11 S	18 F
	Minimum	6.0 W	5.8 Sp	58 Sp	7 W	30 F	10 S	4 W	38 S	46 S	106 Sp	12 Sp	10 Sp	3 S	3 Sp	5 S
1966	Mean	6.5	7.5	77	18	35	45	6	97	103	141	19	23	7	17	10
	Maximum	7.8 S	9.1 Sp	86 S	28 S	89 W	90 W	14 S	182 F	190 F	168 S	38 Sp	31 S	13 W	115 Sp	16 Sp
	Minimum	5.8 Sp	4.9 Sp	53 Sp	9 W	30 Sp	20 W	0 W	40 S	46 S	116 Sp	13 S	12 Sp	3 S	6 F	7 W

a/ Unpublished Data. Louisiana Wild Life and Fisheries Commission. Division of Water Pollution Control

b/ Sp = Spring
S = Summer
F = Fall
W = Winter

SETTING

Plant and Animal Resources (Flora and Fauna)

There are three broad ecosystems found in this watershed. These systems include the forest land, open land, and the aquatic environment. Three plant communities are present in the forest land ecosystem and include (1) bottom land hardwood, (2) mixed pine-hardwood, and (3) planted pine.

Transitional vegetation occurs along the edges or borders where forest land and open land meet. Transitional vegetation is a mixture of species common to the overstory, understory, and open land. This situation exemplifies the "edge effect" which is very productive wildlife habitat.

The overstory vegetation in the bottom land hardwood plant community contains cypress, tupelo gum, green ash, red maple, magnolia, willow oak, overcup oak, and water oak. Understory vegetation includes blackberry, greenbrier, common buttonbush, hawthorn, ferns, grasses, forbs, and reproduction from overstory species.

Overstory vegetation in the mixed pine-hardwood plant community includes loblolly and longleaf pine, white oak, Southern red oak, blackjack oak, sweetgum, persimmon, magnolia, and blackgum. Understory vegetation consists of dewberry, waxmyrtle, wild grape, arrow wood, blackberry, American beautyberry, huckleberry, yellow jessamine, Japanese honeysuckle, sweet bay, dayflower, asters, goldenrod, sumac, trumpetcreeper, and grasses including pine hill bluestem, switchgrass, slender bluestem, cutover muhly, low panicums, and paspalums.

The overstory vegetation in the planted pine community consists of slash pine. Understory vegetation is similar to that described for the mixed pine-hardwood plant community, but is not as abundant because of the canopy condition.

Grasses grown for pasture production include bahaigrass, bermudagrass, fescue, dallisgrass, carpetgrass, ryegrass, and small grains including wheat and oats. The primary crops produced on the open land are rice and soybeans.

Aquatic vegetation in and along the edges of the farm ponds include water hyacinth, duckweed, cattail, water primrose, yellow waterlily, pond weeds, various algae, and phytoplankton. Aquatics growing in and along the edges of the larger channels include cattail, smartweeds, water primrose, spikerush, alligator weed, fall panicum, horned beakrush, and lizardtail. Various algae and phytoplankton occur in the Calcasieu River.

SETTING

Only one type of natural area occurs in the project area, and it is in the climax stage of plant succession. It is identified as the flood plain of the Calcasieu River and consists of flood plain hardwoods previously listed for that plant community. This natural area would include the majority of the Type 1 wetlands (seasonally flooded hardwoods).

Forest land totals 38,850 acres (46 percent). Forest land habitat is exhibited in the upper picture on page 34. Indigenous game species associated with this forest land are white-tailed deer, woodcock, fox and gray squirrels, and swamp and cottontail rabbits. Mallards and wood ducks feed in the seasonally flooded hardwood areas. Wood ducks nest in forested areas along the larger streams where suitable nest cavities and brood cover are available.

Open land totals 36,900 acres (44 percent). An example of this type habitat is shown on page 34. Open land game species include the mourning dove, bobwhite quail, snipe, cottontail rabbit, and many species of migratory waterfowl including pintail, gadwall, mallard, widgeon, green-wing teal, blue-wing teal, mottled duck, and blue, snow, and white-fronted geese.

Waterfowl species primarily utilize the rice-producing area of the open land. Other species listed primarily utilize the row crop and pasture areas.

Some species use more than one habitat type. Woodcock, for example feed in forest land but frequently fly to open land to feed in fields.

Wetlands total 820 acres. Type 1 wetlands (seasonally flooded hardwoods, located in the Bibb-Mantachie soil association) comprise 755 acres and Type 5 wetlands (open lakes and ponds up to 10 feet deep) total 65 acres. Examples of these wetlands are exhibited on page 35. Wetlands are primary habitat for waterfowl and serve as escape cover for deer. Furbearers and many other species of nongame animals and birds also utilize the wetlands.

Other common mammals, birds, reptiles and amphibians present are (1) mammals: nutria, muskrat, raccoon, opossum, striped skunk, mink, bobcat, gray fox, and coyote; (2) birds: blue jay, belted kingfisher, barred owl, cardinal, brown thrasher, Eastern bluebird, red-shouldered hawk, house sparrow, downy woodpecker, mallard, blue-winged teal, pintail, gadwall, common crow, and Louisiana heron; (3) reptiles: redeared turtle, three-toed box turtle, smooth softshell turtle, common snapping turtle, five-lined skink, ground skink, green anole, coral snake, copperhead, king snake, and western cottonmouth (4) amphibians: Spring peeper, bullfrog, squirrel tree frog, Southern leopard frog, and dusky salamander.

Forest Land Habitat

Open Land Habitat (Soybeans after Harvest)

Type 1 Wetlands (Seasonally Flooded Hardwoods)

Type 5 Wetlands (Open Lakes and Ponds)

SETTING

Populations of game animals (except wild turkeys) are at or near carrying capacity of the habitat. Wild turkeys have been stocked and a breeding population currently exists in the West Bay Wildlife Management Area. The 3,200-acre portion of the management area which is within the watershed is north of Louisiana Highway 26. It is too early to determine the success of the wild turkey in this area. The tabulation on the following page shows the current populations of game species. This data represents averages for the project area.

Utilization of the wildlife resources is high. Both small game and big game hunting are popular. During the 1970-71 hunting season in Allen Parish, 3,920 basic hunting licenses were sold. Basic hunting license sales are increasing statewide. For example, in 1960, 317,087 licenses were sold while in 1970 sales had increased to 475,868.[11] Other uses of the wildlife resources are nonconsumptive and consist mostly of outdoor photography, bird watching, and aesthetics.

Access to the existing wildlife resources is good. The West Bay Wildlife Management Area has all-weather roads for access. The majority of the private open land and forest land is accessible by all-weather roads. Some of the roads are flooded after heavy rains. Most landowners will grant permission to hunt on their property.

Recently, the U.S. Fish and Wildlife Service, Division of Rare and Endangered Species, changed its classification of "rare" and "endangered" species status to include different categories. Two of these classifications[12] apply to species[13] that could be in this watershed and are defined as follows:

> Endangered species are those which are on the verge of extinction. Their numbers may have been greatly reduced by man's activities or they always have been rare and could easily become extinct.
>
> Status Undetermined are species which have been suggested to be endangered but not enough information is available on their numbers to determine their exact status.

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[11] State of Louisiana, Louisiana Wild Life and Fisheries Commission, 14th Biennial Report 1970-71, (New Orleans: Louisiana Wild Life and Fisheries Commission, 1972), p. 27.

[12] U.S. Department of the Interior, Fish and Wildlife Service, Threatened Wildlife of the United States, Resource Publication 114 (Washington: U.S. Government Printing Office, 1973), p. 208.

[13] U.S. Department of Agriculture, Soil Conservation Service, Technical Note 38, July 1973, p. 6.

Current Game Populations by Habitat Type

Species	Habitat Type	Acres	Number[a] Per Acre(s)	Total in Watershed
Deer	Forest Land	38,850	1/50	777
Squirrels	Forest Land	38,850	1/3	12,950
Rabbits	Forest Land and Open Land	75,750	1/3	25,250
Doves[b]	Open Land	36,900	1/3	12,300
Quail	Longleaf Pine	4,000	1/8	500
Quail[c]	Forest Land	34,850	1/50	695
Quail	Open Land	36,900	1/15	2,460
Waterfowl (Resident)	Forest Land, Open Land, and Water Areas	75,850	1/400	190
Waterfowl[b]	Forest Land, Open Land, and Water Areas	75,850	1/20	3,790
Turkeys[d]				

[a] Data developed in cooperation with Louisiana Wild Life and Fisheries Commission.

[b] Migratory

[c] Excluding the longleaf pine type

[d] Turkeys have been stocked in West Bay Wildlife Management Area and only a breeding population exists.

SETTING

The red-cockaded woodpecker is classified in the "endangered" species category. A colony exists in the forested area near Channel M-7. Other species in the "endangered" category that may be here or may be an occasional visitor is the Southern bald eagle. The wood ibis and the osprey, which are in the "status undetermined" category, could occur.

There are no "threatened" plants listed for the project area from available literature.[14/]

Fisheries within the watershed are found in Calcasieu River, 25 farm ponds, lower portions of Channels M-1, M-2, M-5, and M-7; Long Gully, Stines Creek, and Reeves Creek. Calcasieu River, the outlet for the watershed, is a perennial stream. Portions of the four project channels (M-1, M-2, M-5, and M-7), Long Gully, Stines Creek, and Reeves Creek have intermittent flow conditions. Long Gully, Stines Creek, and Reeves Creek will not be disturbed by the project.

The part of Calcasieu River in the Watershed is 18 miles in length, has an average width of 100 feet, and has 220 surface acres. The river has a highly diversified fish population with a standing crop of 100 pounds per acre.[15/] About 20 percent of the population is game fish, 30 percent is commercial fish, and 50 percent is rough and forage fish species. Important game and commercial fish species are largemouth, spotted, and yellow bass; spotted, longear, and green sunfish; warmouth; flier; bluegill; black and white crappie; channel, blue, and flathead catfish; smallmouth and bigmouth buffalo; bullheads; gars; and freshwater drum. There are no known species of fish that are threatened within the project area.[16/] The tabulation on page 39 contains a list of fish species for Calcasieu River.

Twelve of the 25 farm ponds totaling 40 acres have been stocked with largemouth bass, bluegill, and redear. The 13 remaining ponds totaling 23 acres are devoted to the production of channel catfish with average annual production of 1,500 pounds per acre. There are no crawfish ponds in the project area.

[14/] U.S. Department of Agriculture, Soil Conservation Service, Threatened Plant List for Louisiana (Unpublished report, 1974).

[15/] Unpublished data from the Louisiana Wild Life and Fisheries Commission, Hoop Net Sampling Data, April 1969 and Fish Population Sampling in Calcasieu River, December 1973.

[16/] R. R. Miller, "Threatened Freshwater Fishes of the United States," Transactions of the American Fisheries Society, Volume 101, No. 2 (Lawrence, Kansas: Allen Press, 1972), pp. 2-5.

FISH SPECIES FOUND IN CALCASIEU RIVER[a]

Game Fish	Rough and Forage Fish
Largemouth bass	River carpsucker
Spotted bass	Grass pickerel
Spotted sunfish	Spotted sucker
Longear sunfish	American eel
Bluegill	Mosquitofish
Green sunfish	Blackstriped topminnow
Warmouth	Pirate perch
Flier	Banded pigmy sunfish
Yellow bass	Blackspotted topminnow
Black crappie	Strip mullet
White crappie	Madtom
	Brook silversides
	Gizzard shad
	Threadfin shad
Commercial Fish	Bowfin
	Skipjack herring
Channel catfish	Shovelnose sturgeon
Black bullhead	Southern brook lamprey
Yellow bullhead	Chestnut lamprey
Flathead catfish	
Blue catfish	
Freshwater drum	
Paddlefish	
Longnose gar	
Shortnose gar	
Spotted gar	
Alligator gar	
Smallmouth buffalo	
Bigmouth buffalo	

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[a] Unpublished sampling data from the Louisiana Wild Life and Fisheries Commission.

SETTING

Channels M-1, M-2, M-5, and M-7; Long Gully, Stines Creek, and Reeves Creek have intermittent flow in the lower reaches. Intermittent flow exists in a total of 17 miles with a surface area of 40 acres. The distribution of the mileage among channels is shown as:

Channels with Intermittent Flow

Channel	Miles[a/]
M-1	6.6
M-2	3.9
M-5	1.5
M-7	2.0
Long Gully	1.0
Stines Creek	1.0
Reeves Creek	1.0
Total	17.0

[a/] These miles are located on the lower ends of these channels.

Standing fish crops in intermittent channels during periods of flow average about 15 pounds per acre. Carp, gar, and catfish are predominant in these channels; however, some game fish species were also present. The diversity of species present in the Calcasieu River is not found here because of the lack of flow. The following tabulation is a summary by category of fisheries data for the project area.

Fisheries Data Summary

Category	Acres	Standing Crop	Pounds
Calcasieu River	220	100 lbs/ac	22,000
Farm Ponds (Bass-Bluegill)	40	125 lbs/ac	5,000
Farm Ponds (Channel Catfish)	23	1,500 lbs/ac	34,500
Channels M-1, M-2, M-5, and M-7; Long Gully, Stines Creek, and Reeves Creek	40	15 lbs/ac	600
Total	323		62,100

Public access to the existing fisheries is poor. Calcasieu River has three road crossings in the project area. Small fishing boats can be "hand-carried" to the river at these locations. Access to privately-owned farm ponds, which provide fishing opportunities to the individual landowners and guests, is good.

Utilization of the fishery is average considering the access limitations and the lack of high quality fishing areas. Calcasieu River is used moderately for both sport and commercial fishing. During the 1970-71 fishing season, 1,278 resident fishing licenses were sold in Allen Parish.17/ Fishing license sales are increasing statewide.

Economic Resources

There are three broad categories of industries in the economy of any region: (1) basic industries such as farming, mining, and forestry which are based on natural resources; (2) processing industries such as grain elevators, petroleum refining plants, and lumber mills which depend on the basic industries; and (3) service industries such as wholesale and retail stores, communications, transportation, medicine, etc., which are based on the other two industries as well as their own members.18/

The economy of the watershed is based primarily on agriculture although there are petroleum wells in some sections. Crop production, the most important sector of agriculture, is followed by forestry and pasture production. The major farm and ranch enterprises are rice, soybeans, and cattle. Pulpwood, saw logs, and poles are the main forestry items produced; however, little of these contribute to farm income since most of the forest land is owned by commercial timber companies. Agriculture related industries include grain elevators, fertilizer mixing plants, agricultural flying services, pulpwood loading yards, sawmills, tractor and equipment dealers, and others. These industries are in the watershed and nearby towns.

In 1967, Allen Parish produced $7,903,000 worth of petroleum, natural gas, and natural gas liquid; in 1968, it produced $6,361,000 worth.19/ The 1968 value represents 832,259 barrels of crude oil, 256,343 barrels of condensate, 1,612,409 m.c.f. (million cubic feet)

17/ State of Louisiana, Louisiana Wild Life and Fisheries Commission, op. cit., p. 28.

18/ Gerald A. Doeksen, Robert E. Daugherty, and Charles H. Little, "Multiplier Effects of Agriculture and Other Industries," OSU Extension Facts, Science Service Agriculture No. 808 (Stillwater: Oklahoma State University), pp. 808-808.1.

19/ James R. Robo and Dean A. Dudley, Statistical Abstract of Louisiana, 4th ed. (New Orleans: Division of Business and Economic Research, College of Business Administration, Louisiana State University at New Orleans, 1971), p. 353.

of casinghead gas, and 10,653,264 m.c.f. of natural gas.[20] Although total values of minerals removed are high, only a small percentage of this money constitutes salaries of employees within the watershed. Since the oilfields are small, royalties are paid to relatively few landowners.

Approximations based on the 1970 Census of Population indicate that the watershed population was 4,400, all of which were classified as rural. About 2,300 of these people lived in the town of Kinder. There were about 1,325 households in the watershed. The work force was about 1,275 persons with approximately 6 percent unemployed. The median family income was about $5,857. About 15 percent of the work force was employed in agriculture.

The number of farms is decreasing and the size is increasing. The following data from the Census of Agriculture showing farms grouped by size for Allen Parish exemplify this.

Farm Size	1959 Number	1959 Percent	1969 Number	1969 Percent
Under 50 acres	408	53	166	32
50 to 99 acres	115	15	93	18
100 to 179 acres	77	10	74	14
180 to 259 acres	35	5	38	7
260 to 499 acres	59	8	55	11
500 and over	73	9	97	18
Total	767	100	523	100

Rice and soybeans are the two principal crops grown in the problem area. About 10,500 acres of rice and 14,300 acres of soybeans were grown in 1973. Rice yields range from 18 barrels to 32 barrels per acre and soybean yields range from 10 bushels to 34 bushels per acre depending on the severity of the wetness problem. Rotation of rice and pasture is rapidly being replaced with rice and soybeans. As of 1973, only 4,000 acres of rotational pasture and 1,200 acres of high and low management pasture remained.

[20] Ibid., p. 360.

SETTING

About 38,850 acres of forest land exist in the watershed. About 25,650 acres of this is industrially owned and the remaining 13,200 acres is privately owned. A portion of the private ownership is leased or managed by forest industries. Small privately-owned tracts are scattered throughout the forest. Improved management, application of desirable practices, and harvesting with plans for the future have progressively improved forest stand composition to include a greater proportion of desirable species of pine and hardwoods.

Acreages of forest land are not expected to change significantly from the present. There is a papermill in DeRidder (40 miles from the watershed) and two in Elizabeth (25 miles from the watershed). Other forest-related industries are located within a 50-mile radius. The high growth rate of trees, high demand, and ease of marketability of timber products should provide incentives for the land to remain in trees. Another indication is that from 1959 to 1973, approximately 500 acres were cleared while 2,000 acres were planted in pine seedlings.

Analyses, in which 1969 Census of Agriculture data were used, indicate that there were approximately 200 farms in the watershed averaging about 200 acres in size. Crop and pasture acreage average about 190 acres per farm. An estimated 90 percent of the farms are family types and are distributed uniformly in the open land portion.

Land values for agricultural purposes range from $300 per acre for poorly-drained land to $450 per acre for the better-drained land. These values depend on location, soil type, and degree of conservation measures applied. Forest land values range from $200 to $300 per acre, plus stumpage value of timber on the land. Present prices for good sawtimber in the area average $90 per thousand board feet for pine, $35 per thousand board feet for mixed hardwoods, and $6 per cord for pine pulpwood. Stocking averages about 3,000 board feet of sawtimber and 7 cords of pulpwood per acre.

Approximately 135 miles of roads exist in the watershed. About 60 miles are hard-surfaced and 75 miles are graded or graveled. Farm-to-market and travel routes are adequate except that an estimated 10 miles of roads flood after heavy rainfall. The two major railroads providing service have loading facilities at several points.

The watershed is located within the Lower Mississippi Region Comprehensive Study Area and the Southwest Louisiana River Basin Study Area. The work plan is compatible with the objectives of these studies.

Recreational Resources

A 1970 inventory conducted by the State Parks and Recreation Commission lists 24 recreational sites for Allen Parish and 23 recreational sites

for Jefferson Davis Parish. According to the Bureau of Outdoor Recreation's land classes, 46 of these were recreational and 1 was natural environment. Four of these sites are in the watershed. These consist of (1) the town park in Kinder having two baseball diamonds, a picnic area, and picnic tables; (2) two groups of private camps and lodges - one by the Calcasieu River south of the Louisiana Highway 26 crossing and another south of the U.S. Highway 190 crossing, and (3) a public camping site for hunters located on Louisiana Highway 26 west of the Calcasieu River. Some bank fishing, float fishing, boating, and swimming occur on the Calcasieu River.

There are no known major pollution problems in the watershed. The high water quality of the Calcasieu River has encouraged public recreational use. Public access and use of outdoor recreational facilities are good. About 300,000 forested acres are available in Allen Parish for hunting, fishing, and other public recreation.

Most of the 38,850 acres of forest in the watershed are available to the general public for hunting, picnicking, hiking, bird watching, and other dispersed recreation uses.

Archaeological, Historical Values, and Unique Scenic Areas

The earliest known inhabitants of this area were the Attakapas Indians. The name Attakapas means "man eater." Shortly before the white man came to Louisiana, the Attakapas were defeated by the Opelousas and other Indians of the surrounding territory. The land in the vicinity of the watershed then became the territory of the Opelousas. These Indians settled outside of the watershed boundary approximately 9 miles southwest of the present site of Kinder on the banks of the Calcasieu River. This settlement is presently known as Indian Village.21/

The first permanent white settlers began to come into this area about 1816. French and Acadians settled largely in the southern part of Allen Parish in the prairie section.22/

The construction of a railroad from Lake Charles to Alexandria was the major impetus to the establishment of the town of Kinder. The railroad was completed in 1891 and a depot was constructed that same year. The town was laid out in 1892 and by 1910 it had a population

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21/ Wilbur C. Holland, Leo W. Hough, and Grover E. Murray, Geology of Beauregard and Allen Parishes, Geological Bulletin No. 27 (Baton Rouge: State of Louisiana, Department of Conservation, 1952), pp. 5-6.

22/ Ibid., p. 7.

of 635 persons. Allen Parish, formerly a portion of the old Imperial Calcasieu Parish, was established in 1912.[23/]

In 1908, the Peavy Burns Lumber Company established a sawmill and their central business offices a few miles from Kinder. The company constructed houses at the mill site for 50 families whose household head was employed by the mill. Shortly thereafter, a turpentine mill was constructed. These two industries represented an important stride forward for Kinder. Up to this time the principal occupation was farming. The climate, soil, and abundant water supply were factors which established rice as the staple crop. The settlers raised what they referred to as "Providence" rice. They tilled the land with ox-drawn plows, built levees, planted rice, and depended upon Providence for rain. At that time, there were no facilities for irrigation.[24/]

The Curator of Anthropology and the Louisiana Historic Preservation Officer have been contacted concerning known archaeological and historical sites within the watershed. The National Register of Historical Places was also reviewed. No known archaeological or historical sites are on record within the watershed.

The Soil Conservation Service contracted with Louisiana State University to conduct a survey in order to determine the existence of any archaeological or historical sites that would be affected by installation of structural measures. This survey is complete. No archaeological or historical sites were discovered by this survey that are located within the area to be disturbed by the installation of structural measures and no further investigation was recommended.

Two National Champion Big Trees of historical value exist in the area. One is a blackgum (15 feet, 3 inches in circumference) located in Section 12, T5S, R5W near the intersection of Long Gully Creek and the Calcasieu River. The other is a water tupelo (27 feet, 1½ inches in circumference) located in Section 22, T6S, R5W. This tree is 450 feet from the north end of the Calcasieu River Bridge by Kinder Canal.

Soil, Water, and Plant Management Status

Soybeans became a popular crop in the early 1960's. This is reflected by data for Allen and Jefferson Davis Parishes which show that planted acres increased each year from about 38,000 in 1965 yo approximately 157,000 in 1972. With this increase has been a corresponding decrease in other cropland uses. A change from rice-pasture rotation to rice-soybeans rotation is also attributable to the progressive increase in soybean acreages.

23/ Kinder Comprehensive Plan (Unpublished report for the town of Kinder), pp. 3-4

24/ *Ibid*., p. 4

Future changes in land use are expected to be small. The following tabulation exemplifies this.

Land Use	PRESENT Acres	PRESENT Percent	FUTURE WITHOUT PROJECT Acres	FUTURE WITHOUT PROJECT Percent
Cropland	35,700	43	36,250	43
Pastureland	1,200	1	800	1
Forest Land	38,850	46	38,550	46
Other[a]	8,250	10	8,400	10
Total	84,000	100	84,000	100

[a] Includes roads, channels, bayous, lakes, communities farmsteads, rights-of-way, etc.

From 1959 to 1972, approximately 1.2 million acres of forest land were cleared for crop production in Louisiana. During this same period, approximately 500 acres of forest were cleared in the watershed and 2,000 acres were planted in pine seedlings. The majority of the forest lands are being managed for timber production. Stump removal in this watershed is a difficult and time-consuming process which makes clearing costly. Some minor changes such as clearing of on-farm wood lots and increases in road rights-of-way may occur, but forested acres are expected to remain relatively unchanged in the future.

Pastureland comprises 1 percent of the watershed. This is expected to decrease in the future because of the trend toward cultivated crops. The pastureland remaining after project installation will be used mainly to raise cattle for home consumption and income supplementation.

Cropland will increase slightly in the future at the expense of pastureland and farm wood lots. Use of cropland will intensify after the project is installed. Land which is presently fallow or in low-producing rice-rotational pasture will be planted to soybeans.

"Other" land uses will increase slightly because of new residential building and possible improvement of roads and enlargement of channels. Large-scale commercial development is unlikely.

The watershed is in the Calcasieu and the Gulf Coast Soil and Water Conservation Districts. Soil and water conservation plans have been prepared for 157 operating units covering 55,193 acres (about 66 percent of the watershed). An estimated 30 percent of the needed conservation measures have been applied to cropland and pastureland. Land treatment has been applied in problem areas as well as in nonproblem areas. During the last 10 years, landowners and users have applied measures

costing approximately $989,564. Much of this was applied in problem areas.

The Soil Conservation Service district conservationists work closely with the soil and water conservation districts in establishing priorities of work to be done. Various methods are used to promote sound conservation in the area. These methods include radio, television, and newsletters. One district employs a conservation technician and a full-time clerk and the other a part-time clerk to assist Soil Conservation Service field office personnel with the overall conservation program.

The Louisiana Forestry Commission, in cooperation with the U.S. Forest Service through the various Federal-State cooperative forestry programs, is providing forest management assistance, forest fire prevention and suppression, distribution of planting stock, and forest pest control assistance to private landowners. There are no lands administered by the U.S. Forest Service within the watershed. An estimated 78 percent of the forest lands are adequately protected from erosion and have acceptable drainage for this use.

About 6,000 acres of forest land outside the industrial ownership and leased lands are in a relatively unmanaged condition. Since returns from forest land are lower than from row crops, timber stands receive little management from the private landowners. When timber reaches merchantable size, the better quality trees are harvested resulting in poor stocking and low income potential.

Timber stand improvement on private forest lands is needed to improve stocking, hydrologic conditions, and wildlife habitat. Main practices needed include thinnings, improvement cuts, and regeneration. Although timber production is low in these areas, the trees provide valuable wildlife habitat and flood plain protection.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land and Water Management

The soils in this watershed have comparatively low erosion rates and low natural fertility. The generally flat terrain, high rainfall, and clayey subsoil cause a severe wetness problem to exist in cropland and pastureland. This condition prevents many farmers from applying needed land treatment. The Acadia-Wrightsville and Crowley-Mowata soil associations are the two main areas where this occurs. (See the General Soil Map in the Physical Resources portion of the ENVIRONMENTAL SETTING section.) Although this condition exists to varying degrees in the other soil associations, it is not significant to farming because large portions of these areas are forested.

Riceland that is too wet to be rotated with soybeans is fallow plowed to control weeds or allowed to grow volunteer vegetation for grazing. Fallow plowing of this land limits the utilization of residues for land protection during critical rainfall periods. Because of poor vegetation, rice-rotational pasture is often overgrazed. If the wetness is reduced, crop residues could be left on the soil surface during the winter. These crop residues would help reduce raindrop splash, which facilitates erosion. Much of the land being fallow plowed would be planted to soybeans and erosion would be reduced by crop cover.

Fire protection at this time is inadequate. Fire occurrence for the years 1968 through 1973 showed an average of 1.5 percent annual burn. This far exceeds the small watershed goal of .20 percent.

Year	No. of Fires	Acres Burned	Percent of Forested Watershed Burned
1968	61	781	2.0
1969	61	566	1.4
1970	50	920	2.4
1971	28	365	0.9
1972	90	684	1.8
1973	32	136	0.4

Average Annual Burn - 1.5 percent

A fire contactor program aimed at prevention of wildfires, safe debris burning methods, and proper use of fire as a silvicultural tool will be utilized during the installation period.

PROBLEMS

Floodwater Damages and Drainage Problems

Floodwater and drainage problems are inseparable in the crop and pasture areas of the watershed. Drainage is defined as the removal of excess subsurface or surface water from high water tables or normal precipitation. Flood prevention is defined as the conveyance, control, and disposal of surface water caused by abnormally high direct precipitation. Because of the flatness of the watershed, the wetness of the soils, and the high annual rainfall, water problems are closely interrelated. For instance, an abnormally high rain may occur which saturates the soil. Before soil moisture conditions are reduced sufficiently to allow work, a normal rainfall occurs which again saturates the soil and prolongs the excess moisture problem.

One of the important needs of the nearly level open land is adequate drainage outlets. These are necessary for efficient production of the crops and grasses grown in the area. The main channels which provide outlets for many on-farm and group drainage systems are no longer adequate to dispose of the surplus water. This is caused by normal deterioration as a result of sediment and plant growth, and increased runoff. Channels to adequately drain some agricultural areas have never been properly installed. Frequent out-of-bank flows result in delayed planting, cause replanting resulting in the use of additional cultural practices in production, and cause problems in harvesting resulting in use of additional equipment and labor. The quality and quantity of rice, soybeans, and pasture are adversely affected when normal planting or harvesting is delayed.

Local organizations, in cooperation with the Louisiana Department of Public Works, have worked some of the outlet channels. Some channels are no longer adequate. Other channels have inadequate reaches because they were installed in a piecemeal manner from lack of funds. Comprehensive planning is needed to provide adequate outlets and to protect environmental values.

Most of the cultivated land has been in crops for many years. The normal deterioration of channels and a change in crop rotations from rice-pasture to rice-soybeans has rendered the present drainage system inadequate. The increased runoff during periods of high precipitation overtaxes existing channels.

The average annual rainfall is approximately 60 inches. Rainfall of at least 2.3 inches in a 48-hour period occurs on an average of four times a year, 4.6 inches once each year, 7.8 inches once in 5 years, and 9.3 inches once in 10 years. Generally, total damages caused by small floods which occur several times annually are greater than the total annual damages resulting from larger but less frequent floods. Damaging out-of-bank flows in portions of the area occur about three times yearly.

PROBLEMS

Rice, soybeans, rice-rotational pasture, and other minor crops make up 32, 45, 11, and 1 percent, respectively, of the cropland. The other 11 percent is in fallow land. Depending on the severity of the wetness problem, rice yields range from 18 to 32 barrels per acre and average about 28 barrels per acre; soybean yields range from 10 to 34 bushels and average about 29 bushels per acre. The pasture yields range from 40 pounds of beef per acre on rice-rotational pasture to 200 pounds per acre on the high management pasture. The average pasture yields are about 65 pounds per acre.

Rice will be used to illustrate the water problems in the watershed because it is the main cash crop and most other farm enterprises are planned around its production. Research has shown that rice planted in March or April is higher yielding than rice planted in May or June.[1/] Because of the wet conditions, however, the soil is often untillable during the early months; planting is delayed and yields are reduced. If the weather does permit early planting and rain later causes flooding before the rice is large enough to tolerate the high water, rice seedling population is reduced. These areas would need to be replanted. If the rice does survive and the farmer decides not to replant, it will be long and spindly and lodge at maturity causing losses. The farmer often keeps the existing crop because he runs the risk of having the same problem occur after he replants. Additionally, the replanted crop will probably be lower yielding because of the later planting date.

In some areas, floodwaters back into the fields and cause breaks in irrigation levees. The inability to manage irrigation water also results in an inability to control weeds which greatly affects yields.

Storms which cause flooding and poor drainage at harvest time affect quality significantly enough to lower prices received. Flooding in a ricefield ready for harvest is exhibited by the upper picture on page 51. The items significantly affecting the price received for rough rice are head rice and grade.

Head rice is defined as unbroken kernels together with those broken kernels equal to or greater than three quarters the size of an unbroken kernel. The main reason for the kernel's breaking is overripeness. This often happens when a large rain occurs at the time that a field of rice is ready to harvest. Wind during the rainstorm causes the rice to lodge and lie in the water and the poor drainage causes the water and moisture to remain in the field for long periods. This wetness causes the moisture in the rice to test higher than the allowable tolerance. Therefore, harvest has to be delayed and the rice becomes overripe. Level 1 of head rice which is equal to or less than 79.9 pounds per barrel can cause a decrease in price of as much as $0.70 per barrel. Level 5 of head rice which is equal to or greater than 110 pounds per barrel can cause an increase in price of as much as $0.55 per barrel.

1/ 58th Annual Progress Report, Rice Experiment Station (Baton Rouge: Agricultural Experiment Station, Louisiana State University, 1966), p. 12.

Foreground - Flooding Problem on Pasture
Background - Rice which was Ready for Harvest
before it Lodged in the Floodwater

Flooding in a Field of Soybeans
Which have already set Pods

PROBLEMS

Factors significantly affecting grade are weed seeds, damage, red rice, and chalk. The grade is usually determined by the factor having the lowest rating. For example, if a lot had three factors occurring at level 1 (the best) and one factor occurring at level 3, the rice would be assigned grade 3. The average price difference between the highest operative grade (grade 3) and the lowest operative grade (grade 5) was about $0.12 per barrel. The operative grades are those in which the majority of the rice is classified, mainly the middle grades.

Excess wetness adversely affects grade factors. Rice which stays waterlogged in the field is damaged by fungus diseases. Depending on the weather, it will sometimes sprout or begin to sour and rot. Other times it will get chalky.

Levees break from flooding and cause delays in the initial irrigation thus allowing abnormal weed and red rice infestations. Poor drainage which prevents or delays cultivations and causes herbicides to be less effective allows weed infestations in soybeans. The weed seeds and red rice produced in the soybean fields multiply the control problems when these same fields are rotated with rice.

A research report entitled Effects of Production Practices on Soybean Yields, Costs and Returns, Southwest Louisiana Rice Area, published by the Department of Agricultural Economics and Agribusiness of Louisiana State University, shows how production practices varied among producers. The tabulation on the following page is a summary of production practices considered in the study.

Several important implications from the study are as follows:

1. that low yield producers can increase average yields and returns through increased drainage, liming, and fertilization programs;
2. that low yield producers with careful variety selection, based on soil type, date of planting and date of maturity, can increase yields and incomes;
3. that low yield producers can generally increase yields by planting approximately 1 bushel (row planted) or 80 pounds (broadcast) of certified, high quality seed per acre before May 31;
4. that low yield producers can increase yields and returns by a more complete weed control program (both pre-emergence, post-emergence and conventional) where weed infestation is a problem;
5. that low yield producers can increase yields and returns by a more thorough insect control program when insect infestation is evident; and
6. that low yield producers can lower the costs of production by the use of six-row equipment in the case of row planted soybeans and by broadcast planting with four-row land preparation equipment.

Item	Unit	Yield Groups Low	Medium	High
Average number of acres planted	acres	306.6	404.4	488.2
Good and above surface drainage	percent	32.7	61.0	66.0
Fall plowing	percent	64.4	66.7	70.1
Nine or more preplant land preparation operations	percent	13.9	10.6	4.1
Liming	percent	17.8	31.2	41.2
Fertilization in previous year (1970)	percent	95.0	95.0	96.9
Mixed Fertilizer application in 1971	percent	97.0	98.6	100.0
Land planted to rice in 1970	percent	48.5	50.4	57.7
Average pounds of nitrogen applied per acre	pounds	7.5	8.9	11.0
Average pounds of potassium applied per acre	pounds	63.3	63.7	70.7
Average pounds of phosphorous applied per acre	pounds	59.8	62.5	69.2
Planted foundation seed	percent	3.0	2.2	4.1
Planted early maturing varieties	percent	8.0	12.1	24.7
Used seed protectant	percent	81.2	71.6	78.4
Innoculated seed	percent	100.0	97.9	100.0
Sword opener planter	percent	51.5	44.0	36.1
Double-disc opener planter	percent	19.8	25.5	33.0
Grain drill	percent	23.8	25.5	30.9
Planted broadcast	percent	28.7	30.5	30.9
Completed planting by 5/31	percent	51.5	73.8	85.6
Planted 1.0 to 1.5 inches deep	percent	39.6	46.8	55.7
Planted 2.0 and 2.5 inches deep	percent	53.5	47.5	40.2
Planted on 7 inch rows	percent	16.8	21.3	23.7
Applied pre-emergence	percent	72.3	84.4	75.3
Three or more cultivations	percent	30.7	39.0	29.9
Hand hoeing	percent	27.7	22.7	23.7
Average or better weed control	percent	72.3	83.7	93.8
Applied insecticide	percent	17.8	34.0	42.3
Average or better weather conditions	percent	50.5	58.9	69.1

Although most of the soils in the watershed are low in natural fertility, they will produce high crop yields and large quantities of forage if properly drained and recommended rates of lime and fertilizers are applied. Farmers are reluctant to invest in higher inputs of production when risks of loss are high. If drainage and flooding problems such as those exhibited on page 49 were remedied, land which is fallow or in

low-producing pasture would be planted to soybeans or some other crop in rotation with rice. Yields would improve on a large percentage of the land presently in production.

Flooding of streets and yards in the town of Kinder occurs about twice a year. When large rains occur, the water rises and spreads because of the flat terrain. This spreading causes relatively large areas to be inundated at a shallow depth. Flooding above floor elevations of homes and businesses has not been recorded. The majority of the buildings are on pillars which causes floor elevations to be 1 to 2 feet higher than ground elevations. The pictures on page 55 exemplify this type flooding. Flood damage in Kinder is primarily inconvenience and lower quality of life. No monetary value can be assigned to these. People have to remove their shoes or wear rubber boots to get to or leave their automobiles. Children miss school because they have to wade through water to reach bus stops. Water flowing on street surfaces seeps into sewerage lines and overloads sewerage pumps. Excess water in the lines often causes manhole covers to be displaced allowing contaminated water to flow overland. When large areas are inundated, toilets fail to operate for periods up to 12 hours. The extra load causes sewerage pump life to be reduced. Debris such as leaves and twigs float on yards and have to be removed.

Flooding causes some roads to be impassable. This interrupts farming operations and the use of roads by local residents. School-bus routes have had to be changed during floods causing time delays and school absenteeism to rise. One driver accidentally drove his loaded bus into a ditch because the roadway was covered with water. Fortunately, no injuries or fatalities were reported. Road flooding is illustrated by the picture on page 56. Standing water causes undesirable health conditions in that it harbors mosquitoes. In instances where medical assistance would be required, flooded roads may prevent an individual from receiving timely treatment.

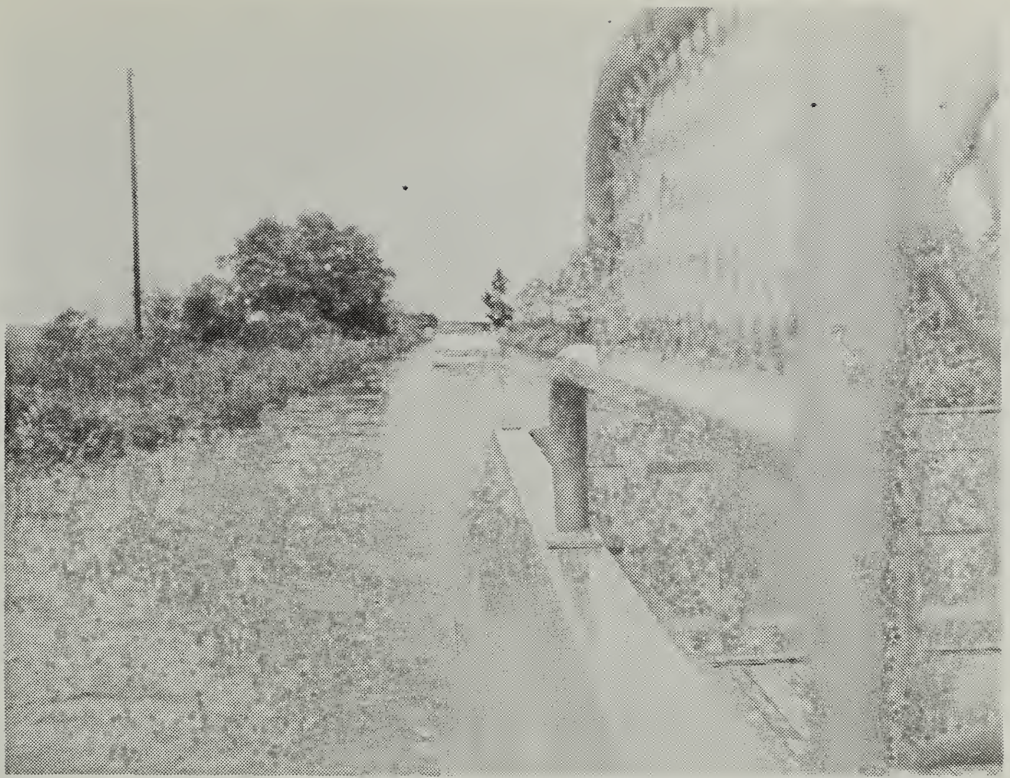
Average annual floodwater damages are $335,300. Of this amount $307,000 are crop and pasture damages, $11,800 are road and bridge damages, and $16,500 are indirect damages. Crop and pasture losses because of impaired drainage amount to monetary values similar to floodwater damages.

Erosion Damage

The flatness of the slopes of the soils throughout most of the watershed causes erosion damages to be low. The areas of steeper topography on each side and parallel to the Calcasieu River are forested and are basically protected from erosion.

Flooding Around a Home

Flooding Around Chicken Coop



Flooding of Farm to Market Road

Flooding of Farm to Market Road

PROBLEMS

Sheet erosion is the major type of erosion within the watershed. While other forms of erosion such as gully, streambank, roadside, etc., are present, they are relatively insignificant. Sheet erosion amounts to 81,157 tons per year or an average of 0.97 ton per acre per year. Land use and cultural practices cause a wide variation from this norm as is shown in the following tabulation:

Land Use	Acres	Average Sheet Erosion (tons/year)	Average Sheet Erosion (tons/acre/year)
Rice	11,600	17,017	1.47
Rice-Rotational Pasture	4,000	4,120	1.03
Rice-Rotational Soybeans	16,000	36,955	2.31
Fallow	4,000	12,485	3.12
Unimproved Pasture	400	87	.22
Improved Pasture	800	50	.06
Forest Land	38,850	2,425	.06
Truck	100	293	2.93
Other	8,250	7,725	.94
TOTAL	84,000	81,157	0.97

A form of erosion which is very evident occurs where farm drains enter channels. Without adequate care the farm drains erode, the banks slough, and small washouts develop. This type of erosion amounts to over 400 tons per year. The amount of soil loss from this form of erosion is insignificant in comparison to sheet erosion. There are no areas which can be classified as critical sediment source areas.

The greater part of the cropland (approximately 30,700 acres out of 35,700 acres) occurs on soils of the Crowley-Mowata Association and the Acadia-Wrightsville Association. These associations have developed on the Prairie Terrace and display the low relief and flat slopes common to this formation. These are very deep soils which have a layer of topsoil approximately 16 inches thick. The soil loss due to sheet erosion on soybeans (2.31 tons per acre per year) would amount to only 0.014 inch per year. The erosion damage in terms of lost agricultural production is not large enough to calculate a monetary value for it.

Sediment Damage

The soil material eroded by sheet erosion is very fine-grained silt and clay. Settling out of this fine-grained material because of changes in water velocity is much slower than more coarse material under similar changes. This, in conjunction with the limited amount of erosion,

causes the sediment to be deposited as a thin film in overflow areas. The nature of the deposition is not conducive to the blockage of the natural drainageways to the channels.

Sediment damages to agricultural land are not large enough to assign monetary values to them. However, sediment in channels provides areas of higher fertility which support the growth of willow trees and other phreatophytes. This causes additional sediment deposition resulting in more maintenance. From an environmental standpoint, sediment causes water to be turbid which (1) lowers the aesthetics of the channels, (2) lowers the diversity and mass of lower food chain organisms, and (3) lowers the quality of this water for domestic and wild animals and for fishery and recreational purposes.

Several channels, M-1, M-3, M-4, M-5, M-6, and M-7, deliver sediment to the Calcasieu River. At the present time these channels deliver an aggregate of 16,633 tons of sediment per year to the Calcasieu River, 7,176 of which are delivered to the river above the sampling station below the U.S. Highway 190 Bridge. Changes in turbidity levels and suspended solids in the Calcasieu River because of sediment from the watershed are insignificant. The large drainage area of the river (1,700 square miles) makes the changes resulting from the discharge of the watershed (131 square miles) unmeasurable. A comparison of water quality in the Calcasieu River at the northern boundary of the watershed (Louisiana Highway 26 Bridge) and near the southern boundary (U.S. Highway 190 Bridge) can be made from the graphs on pages 59 and 60.

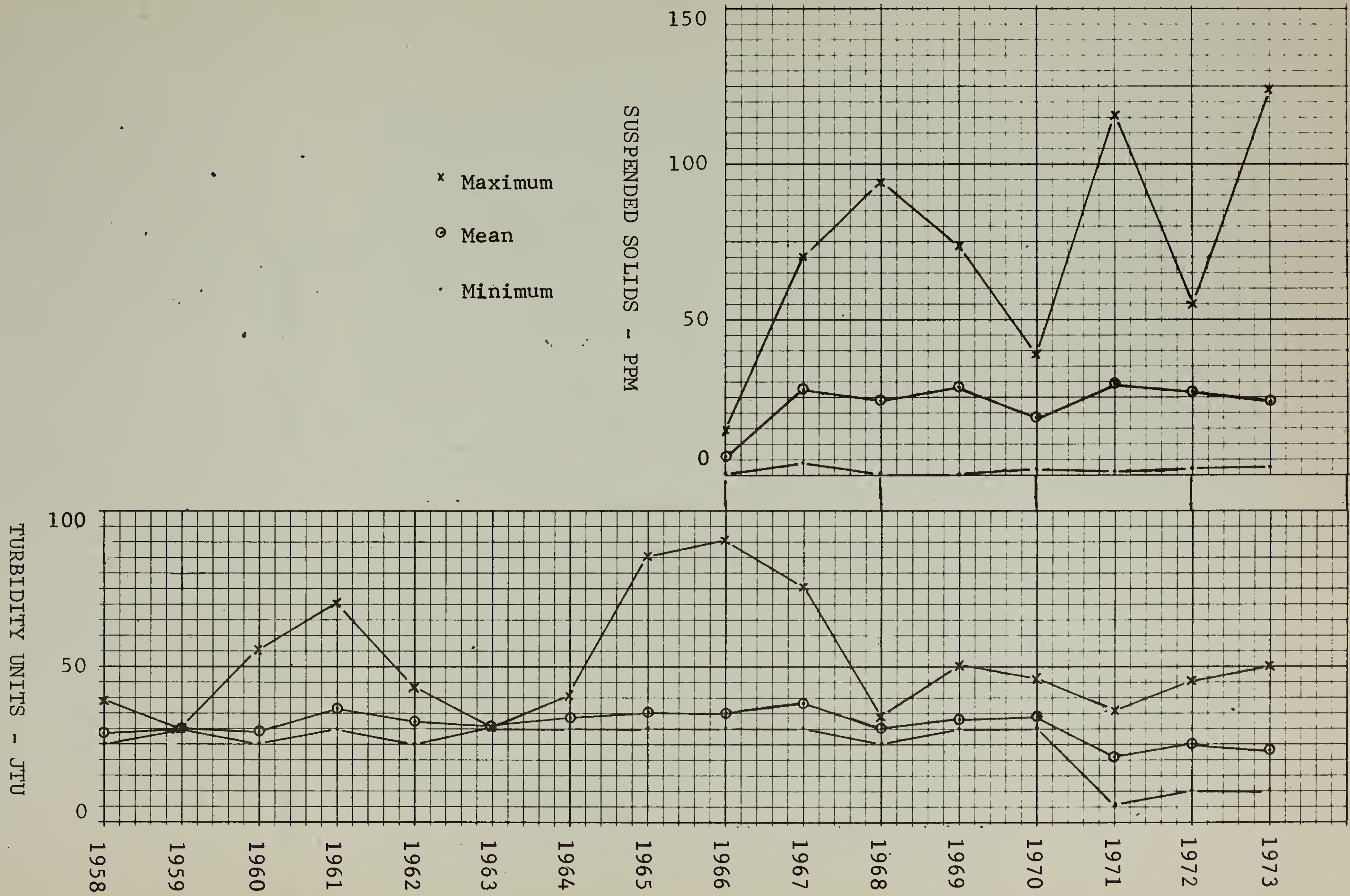
Irrigation, Municipal, and Industrial Problems

The only problems concerning this subject is the decline of the ground water levels at approximately 0.5 foot per year. This will cause a pumping cost increase if this trend continues.

In 1954, 25 to 50 percent of the rice was irrigated with ground water. At the present time, approximately 90 percent of the rice is irrigated with ground water.

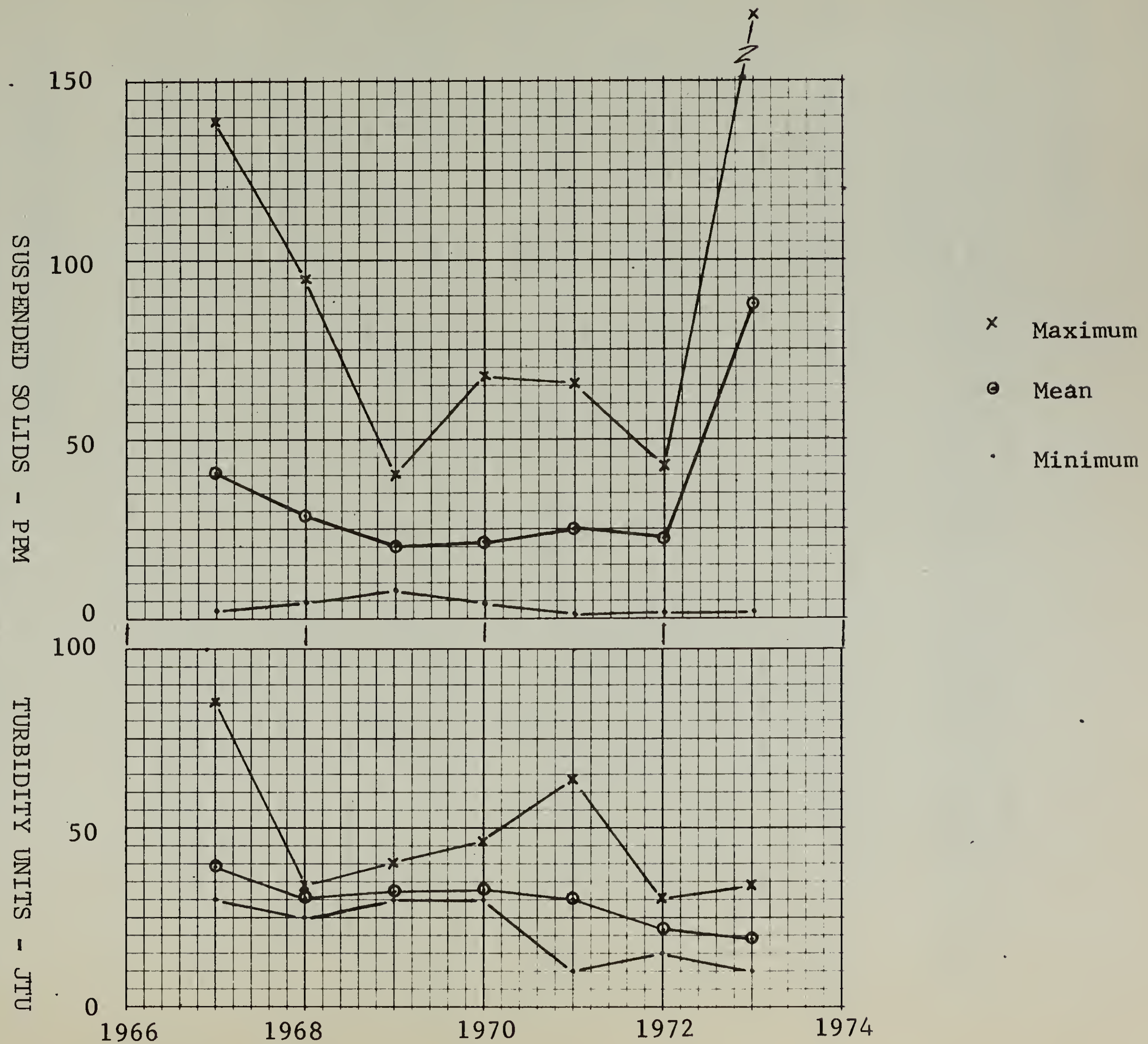
The town of Kinder, the only municipality in the watershed, has three deep wells in use. Population projections show an increase of about 15 percent for Allen Parish for the period 1970 to 1990. The present municipal water supply appears to be adequate to at least 1990.

CALCASIEU RIVER WATER QUALITY - TURBIDITY UNITS AND SUSPENDED SOLIDS, BELOW U.S. HIGHWAY 190 BRIDGE, 1958-1973



SOURCE: Louisiana Wild Life and Fisheries Commission, Division of Water Pollution Control
Baton Rouge, Louisiana

CALCASIEU RIVER WATER QUALITY - TURBIDITY UNITS AND SUSPENDED SOLIDS, LOUISIANA HIGHWAY 26 BRIDGE, 1966 - 1973



SOURCE: Louisiana Wild Life and Fisheries Commission, Division of Water Pollution Control, Baton Rouge, Louisiana

PROBLEMS

Recreation Problems

Local interest exists for developing recreational facilities in the watershed. The Calcasieu River is the only available water resource. Suitable sites for additional storage are not available because of the generally flat terrain.

The 1970 population within a 50-mile radius of the watershed, which includes the Lake Charles Metropolitan Area, is about 389,000. Projections to the year 2020 indicate the population will be 494,000, representing a 27-percent increase in a 50-year period. The topography of the southern half of a circle encompassing a 50-mile radius is flat and the northern half is gently rolling. The area is above average in the quantity of water available for fishing and water sports. Calcasieu Lake, Lake Charles, Bundicks Lake, Indian Creek Reservoir, Cocodrie Lake, and Chicot Lake are within the area of influence but on the periphery of the 50 miles relative to the watershed. The Calcasieu River and the Mermentau River, which originate about 15 miles southeast of Kinder, provide numerous miles for fishing and water-based recreation.

An estimate of recreational needs based on the present population within the 50-mile radius includes 2,000 tent camping sites, 1,300 trailer camping sites, 1,900 picnicking sites, 350 boating ramps, and 12 beaches and swimming areas of standard size.2/ There is a need for additional facilities especially within the watershed. Significant recreation areas used by the public include three wildlife management areas on forest land totaling 223,500 acres, 6,480 acres in Chicot State Park, 1,062 acres in Sam Houston State Park, 2,868 acres in Indian Creek Recreation Area, and 31,125 acres in the Lacassine National Wildlife Refuge. The 183,000-acre Toledo Ben Lake is located northwest of the watershed and just outside the 50-mile radius. This lake provides recreational activities to many, including watershed residents.

Plant and Animal Resource Problems

The plant communities and animal populations are relatively stable. No extensive land use changes are occurring in either the forest land or the open land. Only 500 acres of forest were cleared from 1959 to 1973. In the same period, 2,000 acres were planted in pine seedlings.

One of the main problems affecting game animal populations as reported by the personnel from the Louisiana Wild Life and Fisheries Commission

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2/ Based on State Comprehensive Outdoor Recreation Plan for 1970-1975.

is illegal hunting. The current demand on timber products could adversely affect nongame species such as the red-cockaded woodpecker.

Fisheries are poor in channels in the watershed. Flow conditions, small size of the channels, and water quality are the limiting factors. Perennial streams are nonexistent except the outlet, Calcasieu River.

Water Quality Problems

Water quality is not a major problem in the watershed. The significant aquatic ecosystems are Calcasieu River (outlet) and the farm ponds. Both of these systems have good water quality and the Calcasieu River has been monitored for several years. This data can be found in the ENVIRONMENTAL SETTING section. Intermittent flow channels amounting to about 17 miles have high turbidity readings ranging from 140 JTU (Jackson Turbitity Units, see page D-11) in Stines Creek to 2,855 JTU in Channel M-5. This factor, plus other high water quality parameters, flow characteristics, and lack of quality aquatic habitat are limiting fisheries production. The tabulation on the following page contains water quality data for Channels M-1, M-5, and Stines Creek taken during February and March 1974. This represents the only data available on intermittent flow channels. For more data on interpretations of water quality parameters see appendix D.

Economic and Social Problems

The level of income necessary for surviving on a minimum diet with none of the amenities of prosperity has been determined by the Social Security Administration.3/ An individual is considered poor if his personal income or the income of the family to which he belongs inadequately provides for his subsistence. In 1960, by this definition, 44 percent of all the families in Allen Parish were classified as poor; 65 percent of the poor families were white and 35 percent were nonwhite. In 1966, 37 percent were classified as poor. This was an improvement of approximately 9 percent since 1960. However, 87 percent of all the counties in the United States had a smaller proportion of poor families. About 0.6 percent of the families in the State of Louisiana live in Allen Parish. However, 0.8 percent of all the poor families in the State reside in this parish. Therefore, it has a greater than proportionate share of poor families. This information and

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3/ James R. Robo and Dean A. Dudley, Statistical Abstract of Louisiana, 4th ed. (New Orleans: Division of Business and Economic Research, College of Business Administration, Louisiana State University at New Orleans, 1971), p. 172.

PROBLEMS

Water Quality Data for Channels M-1, M-5, and Stines Creek (February 1974 and March 1974)

February 1974

	M-1	M-5	Stines Creek
Color (apparent)	1,020 units	420 units	490 units
Nitrogen, Ammonia	1.8 ppm	0.7 ppm	1.2 ppm
Nitrogen, Nitrate	0.1 ppm	0.1 ppm	0 ppm
Phosphate, Ortho	1.2 ppm	0.4 ppm	0.4 ppm
Sulfate	0 ppm	0 ppm	0 ppm
Sulfide	0.3 ppm	0.1 ppm	0.2 ppm
Suspended Solids	182 ppm	45 ppm	40 ppm
Turbidity	390 JTU	155 JTU	200 JTU
Temperature	50° F	55° F	50° F
pH	6.5	6.0	5.5
Oxygen	9.0 ppm	8.0 ppm	7.0 ppm
Total Hardness ($CaCO_3$)	18 ppm	12 ppm	12 ppm

March 1974

	M-1	M-5	Stines Creek
Color (apparent	425 units	4,530 units	405 units
Nitrogen, Ammonia	.50 ppm	15.2 ppm	1.1 ppm
Nitrogen, Nitrate	.21 ppm	.57 ppm	.03 ppm
Phosphate, Ortho	.49 ppm	5.6 ppm	.23 ppm
Sulfate	5 ppm	0 ppm	0 ppm
Sulfide	.13 ppm	1.62 ppm	.10 ppm
Suspended Solids	90 ppm	1,050 ppm	40 ppm
Turbidity	145 JTU	2,855 JTU	140 JTU
Temperature	65° F	65° F	67° F
pH	6.5	5.5	5.3
Oxygen	9.0 ppm	5.0 ppm	3.0 ppm
Total Hardness ($CaCO_3$)	12 ppm	35 ppm	14 ppm

that which follows is based upon data for Allen Parish; however, this data was also considered representative of the Jefferson Davis Parish portion of the watershed.

According to the 1970 census for Allen Parish, there were 5,201 families with a median income of $5,931. Of the total families, 1,780 were urban (Oakdale) with a median income of $5,733; 2,842 were rural nonfarm with a median income of $5,857; and 579 were rural farm with a median income of $7,131. About 32 percent of the urban families had incomes less than the poverty level while 30 percent of the rural nonfarm and 25 percent of rural farm families had incomes less than the poverty level. Since the watershed population is all rural, it is estimated that 28 percent of its population is below the poverty level.

Allen Parish economic conditions based on correlates of poverty were equal to the State average in 1970. The correlates of poverty used to determine economic conditions were (1) families having a female head with members under 18 years, (2) primary individuals 65 years of age or over, (3) households having 8 or more persons, and (4) households lacking some or all plumbing facilities.[4/] However, another source[5/] published in 1971 shows that the estimated buying power per household in Allen Parish for 1968 and 1969 were 28 and 29 percent, respectively, below the State average.

Although the population of Allen Parish increased by 927 persons from 1960 to 1970, it had a net out-migration of 1,800 persons. This was 8 percent less than the 1970 population. The expected 1970 population was calculated by adding births from 1960 through 1970 to the 1960 population and then subtracting deaths which occurred during that same time period. Of the total net out-migration, 59 percent were white and 41 percent were nonwhite. Many of the young adults are leaving the farm to seek employment elsewhere. From 1960 to 1970, there was a 2.6-percent decrease in rural males 20 to 39 years of age. There also was a 16.3-percent decrease in children 9 years old and under and a 25-percent increase in persons 60 years old and over. These trends indicate that young productive adults are leaving the farm thereby causing an increasing dependency on machinery. Utilization of remaining labor through greater efficiency is necessary for survival of many of the family farms.

[4/] Fred M. Wrighton and Barbara H. Denton, "Population and Housing Correlates of Poverty in Louisiana, 1970," The Louisiana Economy (Ruston: College of Business Administration, Division of Business and Economic Research, Louisiana Tech University, 1971), Vol. IV, No. 2 (May 1972), pp. 2-5.

[5/] Robo, op. cit., p. 156.

PROBLEMS

Old-age assistance and aid to dependent children were the two largest categories of welfare aid in Allen Parish in fiscal year 1968-69. Of the total value of welfare assistance grants made during the period, 67 percent was for old-age assistance, 17 percent was for aid to dependent children, 11 percent was for disability assistance, 3 percent was for general assistance, and 2 percent was aid to the needy blind. About 49 percent of the parish population is 18 years old or younger and 10 percent is 65 years old or older.[6] Approximately 940 children, representing about 11 percent of the population 18 years or younger, received welfare assistance.[7]

Information from the 1970 census reveals that 11.6 percent of the people 25 years of age and older had never completed 1 year of school; 29 percent were high school graduates. The median was 8.3 years of school completed. There are 11 schools in the parish.

According to 1969 Census of Agriculture data, there are 523 farms in Allen Parish. This was a decrease of about 32 percent in number of farms from 1959 to 1969. The average farm size was 308 acres in 1969, as compared to 196 acres in 1959. In 1969, about 32 percent of the farms were less than 50 acres and about 50 percent were less than 100 acres. Farms in the watershed are continually decreasing in number and increasing in size.

The increasing costs of production inputs and the relatively static prices of agricultural products have caused net returns per acre to decrease. In 1947, the season average price of rice, the main cash crop in the area, reached a high of $5.97 per hundred weight. During the 25-year period of 1947 to 1971, the season average price of rice has fluctuated from a low of $4.10 in 1949 to a high of $5.87 in 1952. In 1971, it was $5.22.[8] The tabulation on the following page exemplifies the "cost-price squeeze" under which the farmers have been operating.

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[6] Ibid., p. 79.

[7] Ibid., p. 87.

[8] United States Department of Agriculture, Agricultural Statistics (Washington: U. S. Government Printing Office, 1972), p. 25.

Year	Yields	Average Price	Gross Returns Per Acre	Total Cost Per Acre	Net Returns Per Acre
	cwt.	- - - - - - - - - -	dollars	- - - - - - - - -	
1959	40.50[a]	4.81[c]	194.81	107.57[a]	87.24
1968	42.18[b]	5.01[d]	211.32	134.79[b]	76.53

[a] Louisiana State University, Department of Agricultural Economics, Budgets for Major Farm Enterprises in the Mississippi River Delta of Arkansas, Louisiana, and Mississippi, D.A.E. Circular No. 281 (Baton Rouge: Agricultural Experiment Station, 1961), p. 42.

[b] Arthur R. Gerlow and Willard F. Woolf, Data for Farm Planning in the Southwest Louisiana River Area, D.A.E. Research Report No. 403 (Baton Rouge: Department of Agricultural Economics and Agribusiness, Louisiana State University, 1969), pp. 26-27.

[c] A 5-year average of prices for the years 1957 to 1961. Prices obtained from the USDA publication Agricultural Statistics, 1972.

[d] A 5-year average of prices for the years 1966 to 1970. Prices obtained from the USDA publication Agricultural Statistics, 1972.

Under the conditions existing in 1959, a farmer using advanced technology could produce 40.50 hundred weights of rice per acre at a cost of $107.57. By 1968, the advanced technology of 1959 had become commonly accepted technology. However, to produce 42.18 hundred weights of rice per acre, it was then costing a farmer $134.79. Because the price of rice has remained relatively unchanged until 1973 and because the cost of production had increased during this period, net returns per acre had changed from $87.24 to $76.53 or decreased by $10.71. Since the farmer has little control on prices, his only alternative is to increase yields and try to reduce costs by whatever means possible.

The increasing size of farms has also increased the average sales per farm. However, about 52 percent of the farms in 1969 in Allen Parish had sales of less than $2,500 (Class VI, Part-Time, and Part-Retirement). About 64 percent had sales less than $5,000 and about 70 percent had sales less than $10,000.

The tabulation on the following page shows the change in number of farms by economic class over a 10-year period.

Economic Class	Sales of	1959 number	1959 percent	1969 number	1969 percent
Class I	$40,000+	23	3	60	11
Class II	20,000 to 39,999	49	6	57	11
Class III	10,000 to 19,999	57	7	40	8
Class IV	5,000 to 9,999	36	5	31	6
Class V	2,500 to 4,999	67	9	61	12
Class VI	50 to 2,499	60	8	69	13
Part-Time		405	53	158	30
Part-Retirement		70	9	47	9
TOTAL		767	100	523	100

Source: 1959 and 1969 Census of Agriculture

Increasing cost of production inputs and relatively static prices of agricultural products until 1973 have caused decreased net returns per acre. This situation has caused many of the small operators to either leave the farm, expand their enterprises into economic size units, or seek employment elsewhere using farm returns as supplementary income. The largest change has occurred in the number of part-time and part-retirement farms. The number of Class IV, V, and VI farms has remained about the same. About 80 percent of the farm operators in these three classes have incomes at or below the poverty level if they have no outside source of income.

Approximately 10 percent of the farms use 1.5 man years-or more of hired labor. These farms are evenly distributed in open land areas of the watershed.

Other Problems

Water for livestock and domestic use in the rural area is supplied by shallow wells, ditches, irrigation canals, and farm ponds. These sources are adequate. Ground-water recharge is mainly from the Calcasieu River.

ENVIRONMENTAL IMPACTS

Conservation Land Treatment

The installation of land treatment measures will improve production, reduce production cost, improve soil cover, increase wildlife habitat, reduce erosion, and improve water quality. The effects of the land treatment practices and structural measures on flood prevention and drainage are inseparable and are discussed in the Flood Prevention and Drainage section under Structural Measures impacts. Land treatment measures will include installation of conservation cropping systems, crop residue use, structures for water control, pasture and hayland planting and management, forest management, plantings for wildlife habitat, and improved water management systems.

Rotations practiced under conservation cropping systems will maintain soil fertility and produce larger, healthier plants. The improved plant conditions will increase crop and forage yields and produce better cover. Use of residues from these crops will provide cover on soils during dominant periods that would otherwise be unprotected. Land smoothing will allow more uniform applications of irrigation water and improve drainage which will increase yields and cover. The pasture and hayland practices will produce more beef production and soil cover.

Improved soil conditions produced under proper management, drainage, and protection will result in better movement of air and water in the soil. These improved conditions, allowing better plant growth which will produce more cover and residue to protect the soil, will result in reductions in erosion and subsequent sediment. These sediment reductions are shown as combined effects in the Erosion and Sediment section of Structural Measures impacts. These are shown in combination because the structural measures are prerequisite to achieving the planned level of land treatment.

The reduction in erosion from land treatment measures will decrease the resulting sedimentation and turbidity. Future sheet erosion over the entire watershed will be reduced from 0.97 ton per acre per year without the project to 0.85 ton per acre per year under future conditions with the project completed. This reduction in sheet erosion, as a result of land treatment measures, will result in a 12.5-percent reduction in sediment. The tabulation on the following page illustrates these changes.

Land treatment measures will reduce sheet erosion from 81,157 tons per year to 71,009 tons per year, a reduction of about 12 percent. Structures for Water Control (pipe drops) will reduce gully-type erosion by 400 tons per year where field ditches enter main or lateral channels.

Sheet Erosion - by Land Use

Land Use	Present			Future With Project		
	Acres	Average Sheet Erosion (tons/year)	Average Sheet Erosion (tons/acre/year)	Acres	Average Sheet Erosion (tons/year)	Average Sheet Erosion (tons/acre/year)
Rice	11,600	17,017	1.47	11,600	15,206	1.31
Rice - Rotation Pasture	4,000	4,120	1.03	1,200	637	0.53
Rice - Rotation Soybeans	16,000	36,955	2.31	22,446	42,736	1.90
Fallow	4,000	12,485	3.12	500	1,561	3.12
Truck Crops	100	293	2.93	100	253	2.53
Unimproved Pasture	400	87	0.22	100	16	0.16
Improved Pasture	800	50	0.06	700	22	0.03
Forest Land	38,850	2,425	0.06	38,633	2,412	0.06
Other	8,250	7,725	0.94	8,721	8,166	0.94
TOTAL	84,000	81,157	0.97	84,000	71,009	0.85

IMPACTS

The wildlife management practices will be primarily retaining existing habitat such as hardwoods along streams and to a lesser extent some hardwoods in managed pine stands. This practice will help maintain existing forest wildlife populations. In addition, wildlife food plots will be planted to benefit both forest and open land wildlife species. These food plots will be installed on a voluntary basis and administered in the same manner as the other portions of the land treatment program. Both of the above described practices will maintain and in some cases enhance the wildlife habitat in the project area.

The forest management plans will help improve the stands and increase productivity and economic returns from the land. These lands will be managed utilizing the multiple-use concept.

The utilization of proper forest management practices on forest land will increase the wildlife carrying capacity. Periodic timber thinnings will open up the canopy permitting more sunlight to reach the forest floor. This stimulates the production of browse for wildlife and increases mast production. However, cotton mice would be harmed by such action.

The accelerated technical assistance for the forest land management and fire prevention program will reduce wildfire occurrence from 1.50 percent to the small watershed goal of .20 percent and improve environmental quality.

Land treatment measures will improve the quality of the water discharged from the watershed. With the project installed, the average suspended sediment concentration entering the Calcasieu River will be reduced. The reductions in sediment will also result in reductions of chemicals which are attached to soil particles. These impacts are discussed under the <u>Flood Prevention and Drainage</u> section and the <u>Fish, Wildlife, and Recreation</u> section of the <u>Structural Measures</u> impacts since the effectiveness of land treatment measures are largely dependent on structural measures.

<u>Structural Measures</u>

<u>Flood Prevention and Drainage</u> - Peak stages in channels downstream from the channel work will be increased because velocities will be increased. However, these increases in peak stages are so minute that they are nearly unrecognizable. The tabulation on the following page lists computed increases immediately downstream from each main channel.

Channel No.	Station	Stage Increase Feet 3-Yr.	10-Yr.	100-Yr.
M-1	25 + 00	0.3	0.2	0.2
M-2	10 + 00	.1	.05	.05
M-3	36 + 00	.01	.01	.01
M-4	35 + 00	.01	.01	.01
M-5	72 + 00	.2	.2	.1
M-6	50 + 00	.1	.1	.1
M-7	143 + 50	.1	.1	.1

Attenuation by the Calcasieu River at the mouth of channels will make the small increases so minute that they will be unmeasurable. Changes in discharges and stages caused by channel work decrease as the distances downstream increase.

The project will provide protection to agricultural land from a storm which is expected to occur on an average of once every 3 years. This does not mean that the runoff from this storm will be contained wholly within banks. Rather, it means that the runoff from the storm will be back within banks 24 hours after the storm ceases. Runoff from storms of greater magnitude will inundate land for periods longer than 24 hours. However, the period of inundation will be shorter than it is under present conditions, thereby reducing the probability of crop loss.

Channels M-1, L-1F, and L-1F1, located on the outskirts of the town of Kinder, are designed to pass the peak flow from a 3-year storm for the urban area. Enlargement of these outlet channels by the project and improvement of the storm sewer system by the town will reduce nuisance type damages and improve living conditions. Average frequency of flooding will be reduced from about twice a year to about once in 3 years. Runoff from storms of greater magnitude will still inundate portions of the town, but for shorter periods of time. Flood hazard duration to roads and streets will be reduced with vehicle traffic back to normal much sooner. Maintenance will also be reduced.

The installation of the combined program of land treatment and structural measures will directly benefit about 32,900 acres of cropland and pastureland. The remaining 4,000 acres of cropland and pastureland in the watershed will not directly benefit from project-type action. Although benefits were not calculated on these acres, they will benefit from the accelerated installation of land treatment measures and by rotational systems made possible by the flood prevention and drainage provided the other lands by the project.

IMPACTS

The project will accelerate the establishment of conservation practices and increase the effectiveness of those already applied. These practices will protect the agricultural resources of the area and improve the environment. Landowners and operators will construct and maintain adequate on-farm and group drainage facilities with the assurance that the desired benefits will accrue.

An estimated 165 farmers will directly benefit from the installation of project measures and land treatment. The remaining 35 farmers will benefit from accelerated land treatment. These measures will aso provide benefits for the 430 farm family members. Farm employees will also benefit. The other 3,970 watershed residents, as well as residents of surrounding areas, will benefit from the increased volume of business generated by the higher incomes and the decreased flooding.

Land use in the entire watershed for "without project" conditions and "with project" conditions is expected to be as follows:

Land Use	FUTURE WITHOUT PROJECT Acres	Percent	FUTURE WITH PROJECT Acres	Percent
Cropland	36,250	43	36,100	43
Pastureland	800	1	800	1
Forest Land	38,550	46	38,427	46
Other[a]	8,400	10	8,673	10
TOTAL	84,000	100	84,000	100

[a] Includes roads, channels, bayous, lakes, communities, farmsteads, rights-of-way, etc.

The preceding tabulation reflects permanent land use changes from one category to another. About 841 acres of land will be disturbed during the installation of channel work. No additional rights-of-way are necessary for installation of the water control structures. Of the 841 acres that will be disturbed, 381 acres are presently occupied by channel rights-of-way. Under "Future Without Project Conditions" there are 98 acres in open land, 114 acres in forest land, and 169 acres in wooded channel banks being taken up by channel rights-of-way (channels, berms, and spoil). "Future With Project Conditions" will require that 248 acres in open land, 237 acres in forest land, and 356 acres in wooded channel banks will be taken up by channel rights-of-way. Project installation will cause an additional 150 acres of open land, 123 acres of forest land, and 187 acres of wooded channel banks to be occupied by channel rights-of-way. These changes indicate that there will be an overall increase in the "other land" category because of additional rights-of-way requirements in open land and forest land. Timber losses on forest land and crop and

pasture losses on open land required for project installation will amount to gross annual values of $2,100 and $21,500, respectively.

With the project installed, rice, soybeans, rice-rotational pasture, other minor crops, and fallow land will make up 32 percent, 63 percent, 11 percent, 1 percent, and 1 percent, respectively, of the cropland. Cropland, now in low-producing rice-rotational pastures and laying fallow during years rice is not produced on it, will be planted to soybeans once the project is installed. Average yields of rice, soybeans, and pasture are expected to increase by about 7 percent, 9 percent, and 90 percent, respectively. The reason for such a large increase in beef yields is that most of the low-producing pasture will go into soybean production; consequently, beef yields with the project installed are represented mostly by the higher yielding pastures. The average prices received for rice, soybeans, and beef are expected to increase by 1 percent, 1 percent, and 2 percent respectively. Floodwater and drainage effects are discussed together because the problems are inseparable. Channels which remove floodwater also remove drainage water.

The reduced flooding and improved drainage will decrease soil wetness and improve field conditions. This will allow better timing of cultural practices and more time to perform needed operations. The higher yields and profits will encourage the application of land treatment practices at a faster rate. Farmers will be better able to leave crop residues on the land during winter months, reduce fall plowing, and rotate crops. This will conserve soil fertility, reduce erosion, improve wildlife habitat, and help control weeds. Planting will be accomplished at more opportune dates. The more level, better-drained fields will allow utilization of larger equipment. This will save labor and reduce costs.

In general, the project will improve economic conditions under which the farmers have been operating. They will be able to:

1. Plant earlier thus getting better plant populations.
2. Control weeds and grasses better.
3. Harvest at more opportune times.
4. Produce higher quality and higher yielding crops.

Incomes will increase and incentives will exist for farmers to apply soil and water conservation practices which otherwise would be beyond their financial means. Yields will be increased because of more uniform plant populations, which will have to compete less with weeds.

Pasture will also be affected. Grasses will grow faster providing more forage. Desirable species will replace unpalatable water tolerant

weeds. Stocking rates will increase. The land will produce nearer to its potential because of these factors and a reduction in the number of grazing days lost.

Reduction in time necessary for land preparation, reduction in frequency of replanting, more effective weed control measures, and more efficient harvesting will reduce annual cost of production about $98,800. Longer periods of time will be available during critical production periods for maximum utilization of equipment and other factors of production. Reduction in flooding and increased timeliness of operations will also increase the quality of products. Average increase in prices received by farmers will be about 1 percent or $47,700.

Watershed needs and objectives will receive primary consideration in the forest management and land treatment program. Improved conditions produced under proper management and protection will allow better movement of air and water in the soil. The management plans for the remainder of the forest land will help improve the stands and increase productivity and economic returns from the land. Forest lands will be managed utilizing the multi-use concept.

Pollution from fertilizer will not increase significantly because of the project. Estimates of fertilizer use in the future show an increase of about 15 percent or 750 tons annually. This amount would be less if research presently being conducted proves successful. This research deals with the time release of nutrients such as inorganic nitrogen which do not remain in the soil for long periods of time. Under continuous crops, soil fertility will decline without further use of fertilizers. Fertilizers now account for approximately one-third of the production of our total food supply.[1/]

Phosphates enter the water supply from agricultural runoff, water treatment, and biological wastes and residues. Industrial effluents, chemical processing, and the use of detergents and surfactants also contribute significantly. A certain amount of phosphate is essential to organisms in natural waters and is often the limiting nutrient for growth. Too much phosphate can produce eutrophication or overfertilization of receiving waters, especially if large amounts of nitrates are present.[2/] Leaching of phosphorus from soils is insignificant. Most

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[1/] U.S. Department of Agriculture, Soil Conservation Service, "Water Pollution from Agriculture," Missouri's All Employees Training Conference - Framework for the Future (Unpublished compilation of speeches and training sessions made at the training conference, 1972), pp. 42-51.

[2/] Water Analysis Handbook (Ames, Iowa: Hach Chemical Co., 1973)

of the loss of these nutrients from agricultural lands to streams and lakes is through erosion. The concentration of phosphorus in aqueous environments is normally low, about .02 ppm, because most phosphates are insoluble in water.3/

Under normal conditions the amount of nitrate in solution at a given time is determined by metabolic processes in the body of water, that is, by the production and decomposition of organic matter. "Hart, et al., report indicates that among United States waters supporting a good fish life, ordinarily 5 percent have less than 0.2 ppm of nitrates; 50 percent have less than 0.9 ppm; and 95 percent have less than 4.2 ppm."4/

The best control methods for preventing fertilizer nutrients from entering water supplies are to apply only the amount needed at the proper time and to use management practices that will reduce erosion to a minimum. The project will create conditions which will encourage the use of such practices.

This project will have no effect on the oil and gas wells or any other industrial facilities or services within the project site.

The estimated reduction in damages for the 3-year level of protection is 73 percent. Annual crop and pasture damages will be reduced from $307,000 to $82,000. Annual damage to roads amounts to $11,800 and with the project will be reduced to $3,100. Indirect damages will be reduced from $16,500 to $4,400. No monetary values were calculated for the reduction of nuisance-type damages and the increased quality of life benefits because these are intangible effects. Better drainage will reduce annual losses on agricultural land by $225,000. Flood prevention and better drainage will allow intensification of agricultural operations resulting in $50,200 annual net income.

Erosion and Sediment - Sedimentation is a direct result of erosion; however, all material that is eroded is not delivered to the outlet channels. The major outlets for the watershed are the Calcasieu River and Bayou Serpent. During the 5-year project installation period, total sediment being delivered to these outlets will be reduced by

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3/Richard H. Wagner, Environment and Man (New York: W. W. Norton and Co., Inc., 1971), p. 122.

4/Jack E. McKee and Harold W. Wolf, Water Quality Criteria, Publication No. 3-A (Sacramento: State Water Quality Control Board, 1963), p. 2.

33,600 tons. The following tabulation shows the reduction by years during this period:

Year	Tons
1	1,900
2	4,400
3	6,200
4	9,400
5	11,700
TOTAL	33,600

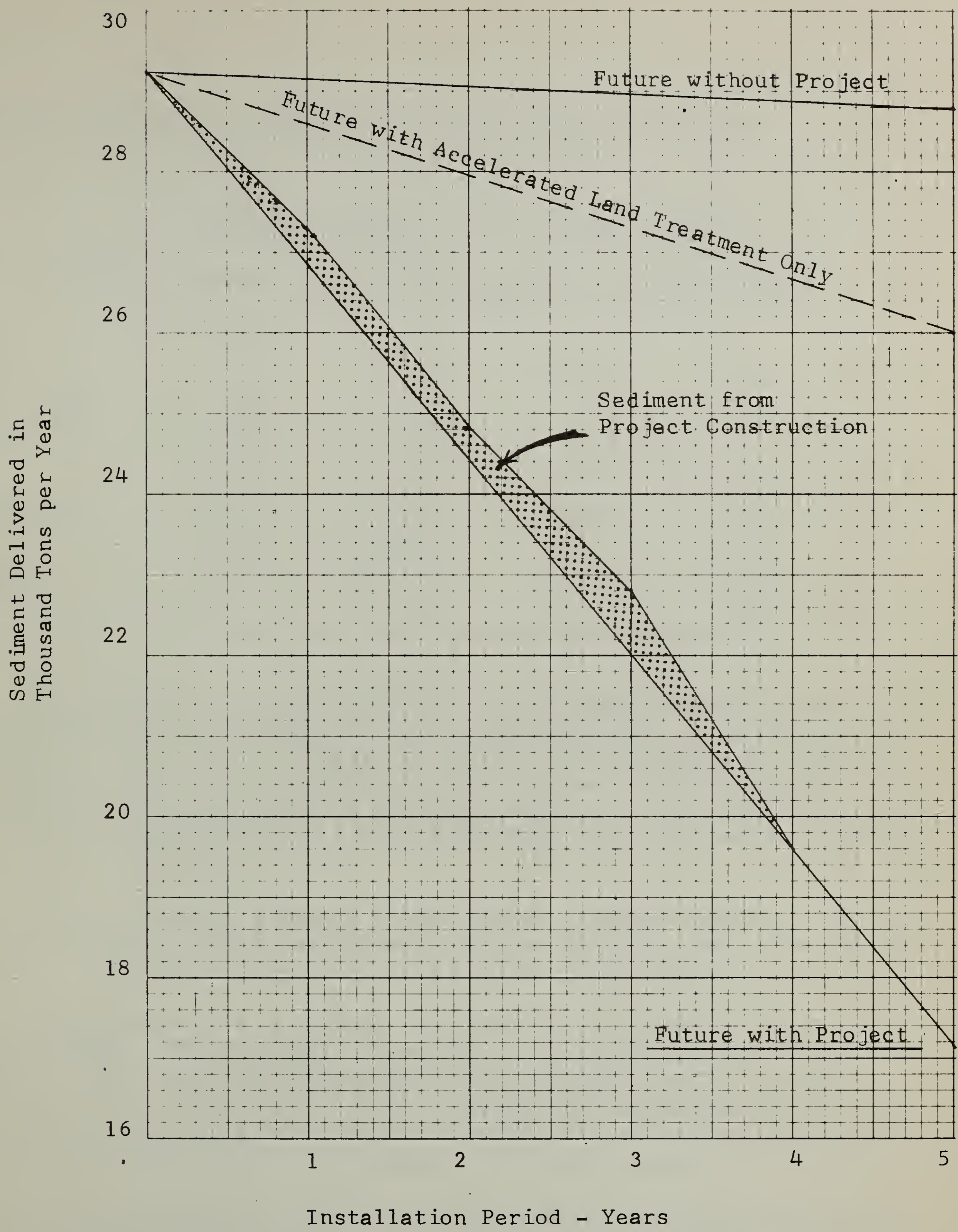
During project installation, excavation of project channels will result in about 7,697 tons of material to be eroded of which 1,310 tons will be delivered to the major outlets. This temporary increase, although more than offset by the net reduction in sediment due to land treatment measures which will be installed preceding construction, will result in a temporary increase in water turbidity in the vicinity of construction. These effects are further illustrated by the graph on the following page.

Sediment delivered to the major outlets during construction will be reduced by installing structures for water control (weirs) in the channel preceding excavation. The sediment delivery ratios were computed considering the trap efficiency of these structures. The amount of sediment that will be delivered to the major outlets resulting from construction activities is shown in the following tabulation:

Channel System	Excavation	Erosion	Sediment Delivered to Calcasieu River	Sediment Delivered to Bayou Serpent
	linear feet	tons	tons	tons
M-1	116,000	2,855	286	-
M-2	45,700	1,036	-	104
M-3 & M-4	6,300	111	111	-
M-5 & M-6	142,100	3,344	669	-
M-7	14,300	351	140	-
TOTAL	324,400	7,697	1,206	104

A reduction in sediment delivered to the Calcasieu River and Bayou Serpent will be realized not only during the project installation period, but also throughout the remaining 50-year project life. The annual

Sediment Delivered to Calcasieu River and Bayou Serpent
Kinder Watershed



sediment delivered to these outlets before and after project installation is shown in the following tabulation:

Channel System	Calcasieu River: Present	Calcasieu River: Future With Project	Bayou Serpent: Present	Bayou Serpent: Future With Project
	tons			
M-1	8,188	3,902	-	-
M-2	-	-	8,065	2,482
M-3 & M-4	1,269	1,119	-	-
M-5 & M-6	6,113	4,238	-	-
M-7	1,063	895	-	-
Subtotal	16,633	10,154	8,065	2,482
Other	4,529	4,529	-	-
TOTAL	21,162	14,683	8,065	2,482

Under present conditions, 29,227 tons of sediment per year are being delivered to Calcasieu River and Bayou Serpent. With the project in place, 17,165 tons of sediment per year will be delivered. This is a reduction of 12,062 tons per year or 41 percent. This reduction reflects not only the reduction in sheet erosion by land treatment measures, but also the trapping effect of the structures for water control (weirs) that will be installed.

Average suspended sediment concentration in water entering Calcasieu River from the watershed was estimated to be 154 mg/l. With the project installed, this concentration will be reduced to 107 mg/l.

Ground Water - The watershed is located in the recharge area of the Chicot Aquifer. Approximately 50 percent of the area has less than 50 feet of clay overlaying the aquifer and the remainder of the area has between 50 and 100 feet of clay. Twenty-five holes distributed over the watershed were drilled to depths in excess of any planned channels. None of these drilled holes encountered the Chicot Aquifer.

At the present time, 90 percent of the water for rice irrigation is pumped from the Chicot Aquifer. In 1969, this and other pumpage from the Chicot Aquifer in southwest Louisiana was causing a decline of approximately 0.5 foot per year in the water level.

Evaluation Unit IV, containing Channels M-5 and M-6, drains into the Calcasieu River immediately upstream from a low-level dam in the

river. This low-level dam was built by the Louisiana Department of Public Works and aids in the recharge of the Chicot Aquifer. At the present time, Evaluation Unit IV contributes approximately 6,000 tons of sediment per year to the river at this location. With the project installed, this sediment discharge will be reduced to an estimated 4,000 tons per year, thereby aiding the effectiveness of the dam.

The installation of six structures for water control (weirs) will cause ponding of water. Some of this ponded water will be used to supplement well water for irrigation.

Fish, Wildlife, and Recreation - Turbidity in Calcasieu River at the project channel outlets will temporarily increase during construction of the channels. This will be dependent on rainfall patterns and flow conditions of individual channels at the time of construction. Reductions of phytoplankton and other aquatic organisms will occur locally during this period. Neither the fish species diversity nor the standing crop will be lowered because of (1) the short duration of time this will occur, (2) the ratio of the watershed drainage area to the river drainage area, and (3) the buffer zone of forested vegetation between construction sites and the river.

Eutrophication is not a problem in this portion of the Calcasieu River. This is a result of the large forested drainage area above the project area, the substantial perennial flow, and the sand in the streambed. These factors significantly limit aquatic enrichment. Eutrophication processes will remain about the same with the project installed.

Project construction will not affect any of the existing 25 ponds. The planned construction will not create any additional farm ponds but landowners will probabily build new ponds during the life of the project. Encouraging private owners to allow public fishing on their ponds will help keep fish populations within limits which permit normal growth.

Intermittent flow channels totaling 10 miles will be modified by project action. Of this total, 7.1 miles will be enlarged and 2.9 miles will be cleared. These channels have been previously modified. Although of low quality and quantity, the fisheries will be adversely affected by the disturbances of 10 miles of intermittent flow channels. This will be caused by losses of channel and bank cover, disruption of the bottom community, and lowering of the base food chain. The diversity of fish species will be lowered causing a higher preponderance of commercial species such as carp, gar, shad, and catfish. Water temperature will not significantly change in intermittent channels because these channels contain water mostly during winter and spring.

IMPACTS

Sixty-three miles of ephemeral flow channels will be worked as a result of project action. Limited production of fish food organisms, such as crawfish and larval forms of insects, occurs in these channels. This production will be temporarily interrupted during construction.

Six structures for water control (weirs) will be installed resulting in 11 miles and 36 acres of permanent water. A combination of ephemeral and intermittent flows currently exists in these 11 miles of channels. The structures will have a beneficial effect upon the aquatic environment within the channels and downstream. Although the 36 acres of water will not be high quality fishery habitat, it will support a standing crop of about 15 pounds per acre. Species composition is expected to be dominated by commercial species such as carp, shad, and catfish. Few people will visit these sites since the habitat created will be of relatively low value for recreation. Impacts of these few visitations on aesthetics, serenity of the countryside, and other environmental factors will be minimal. Shallow water at the upper reaches of each water pool will provide additional habitat for wading birds. Occasional periods of aquatic weed growth may occur in these shallow areas.

Anabaena and _Microcystis_ are the species of blue-green algae most likely to occur during periods of low flow. Their presence would detract from the aesthetics of the water. These algae blooms could also affect fish by (1) emitting a substance, which in sufficient quantity, is toxic and (2) causing an oxygen shortage when they decompose. These will be controlled by pesticides approved by the United States Environmental Protection Agency and the United States Department of Agriculture.

Species of aquatic macrophytes which may occur in the shallow water areas are not certain at this time. Possible species are pondweed, najas, muskgrass, bladderwort, coontail, cat-tail, and duckweed. These are not expected to occur in sufficient quantities to affect fisheries.

Crop rotation changes from rice-pasture to rice-soybeans will result in increased usage of pesticides. However, during the life of the project, sediment yield to downstream areas will be less because of the installation of land treatment measures. Retention of soil as a result of land treatment measures should offset most of the increased use of pesticides.

The problem of pesticides as pollutants is complex. Chlorinated hydrocarbons break down slowly. Use of some of these chemicals for control of insects on crops is presently prohibited. Research is currently underway to find pesticides whose residues will not remain in the food chain for long periods of time. Epps _et al._, in a study entitled "Preliminary Report on a Pesticide Monitoring Study in Louisiana," found residue levels to be related to pesticide usage. Currently the Soil Conservation Service, in cooperation with other Federal and State agencies, has a monitoring program to determine

residue levels in watershed project areas. The Plaquemine Brule Watershed, located about 30 miles southeast of Kinder, is included in this monitoring program. Periodic samples of water, bottom sediment, and fish are collected and analyzed for chlorinated hydrocarbons. This data has been collected for 1 year and will continue for 4 more years.

Recognizing the inconclusiveness of 1 year of monitoring, the results of the first year of testing indicate that:

1. Use of chlorinated hydrocarbons appears to be decreasing.

2. Water samples do not contain detectable amounts of chlorinated hydrocarbons.

3. Bottom sediment and fishes do contain chlorinated hydrocarbons, probably due to residues from applications in past years.

Although a monitoring program is not being conducted in Kinder Watershed, results of such analyses would be expected to be similar to those obtained for Plaquemine Brule Watershed. Conditions in these two watersheds are similar.

Thirty-three farmers representing 10 percent of Plaquemine Brule Watershed were interviewed to acquire data on types and amounts of pesticides applied to crops. Results of this survey are found on the following page and show that 17 different pesticides are currently being used of which only 5 are insecticides. Aldrin and toxaphene are two of these insecticides. By comparison, results from the 1-year samples show that fish species contain the following chlorinated hydrocarbons: BHC (white crappie had .01 ppm and short nose gar had .02 ppm), DDT (white crappie had .13 ppm and short nose gar had 2.69 ppm), Toxaphene (white crappie had .27 ppm and short nose gar had 4.2 ppm), and Dieldrin (bluegill had .04 ppm and short nose gar had .57 ppm). Gizzard shad were also analyzed for the above pesticides and levels ranged in between the low and high listed for white crappie, short nose gar, and bluegill. Bottom sediment contained DDT (0.09 ppm to 0.13 ppm) and Dieldrin (0.0 ppm to 0.01 ppm).

Sixty acres of Type 1 wetlands (seasonally flooded hardwoods) will be affected by project construction. The value of the wetland will be reduced as a waterfowl feeding area. The design of Channel M-2 is such that the amount and duration of water on the wetland as a result of direct precipitation will not be affected. However, water introduced onto the wetland as a result of overbank flooding will be reduced on low intensity rainstorms. Fifteen acres of mixed hardwoods will be cleared from these wetlands for channel enlargement and spoil placement. The remaining 695 acres of Type 1 wetlands and 65 acres of Type 5 wetlands will not be affected by project action.

Pesticide Usage Survey of
Bayou Plaquemine Brule Watershed[a/]
1973

PESTICIDE	Application rate/acre[b/]	Acres receiving application[c/]	Percent of farms using listed pesticide[d/]	Total volume applied
FUNGICIDES				
Captan	$3\frac{1}{2}$ lbs/ac	5,800	72	20,300 lbs
HERBICIDES[e/]				
Alachlor	3 qts/ac	3,495	48	2,620 gals
Fluometuron	2-8 lbs/ac	330	3	9,240 lbs
Linuron	1 lb/ac	1,375	21	1,375 lbs
Molinate	30 lbs/ac	1,160	33	34,800 lbs
MSMA	1-2 lbs/ac	330	3	495 lbs
Nitralin	4 qts/ac	300	9	300 gals
Propanil	4 qts/ac	3,180	51	3,180 gals
Propanil and Molinate (mixed)	3 qts/ac (each)	90	9	330 gals
Trifluralin	1 lb/ac	450	15	450 lbs
2,4-D	1 qt/ac	420	15	105 gals
2,4-DB	2 lbs/ac	100	3	200 lbs
INSECTICIDES[f/]				
Aldrin[g/]	$3\frac{1}{2}$ lbs/ac	5,890	72	20,615 lbs
Carbaryl	$1\frac{1}{2}$ lbs/ac	310	6	470 lbs
Carbofuran	17 lbs/ac	755	15	12,835 lbs
Methyl Parathion	1 qt/ac	1,225	21	305 gals
Toxaphene[g/]	1 lb/ac	260	3	260 lbs

a/ Data prepared by District Conservationist from a survey of 33 farms, comprising a representative sample of 10 percent of the land area.

b/ Application rates based on average rates used by four local flying services.

c/ No pesticides were used on 7,285 acres; one or more pesticides were used on 12,885 acres.

d/ No pesticides were used on 12 percent of farms surveyed.

e/ Most herbicides are applied only once per crop season.

f/ Number of applications varies, depending upon degree of infestation during crop season.

g/ Denotes chlorinated hydrocarbons.

IMPACTS

Game species including deer and squirrels now maintain higher populations on existing habitat conditions along channel rights-of-way than will be present following the project. These animals will be adversely affected by the loss of 168 acres of forest land habitat. However, additional browse and nesting cover will be available on the spoils and berms for deer and other wildlife species.

Postproject rabbit habitat along channels in forest land and wooded channels should be as good as preproject habitat once vegetation is established on berms and spoils. However, the enlargement of channels will result in a loss of rabbit habitat of 90 acres.

Bobwhite quail and doves will be temporarily benefited. Conversion of forest along channels will result in 317 acres of habitat for doves and quail. After a period of about 3 years, the open land condition will change to a brush-type habitat causing its usefulness for doves and quail to diminish. The following summary exhibits construction effects on game animals:

Species	Habitat	Acres	Number of Animals
Deer	Forest Land	- 168	- 3
Squirrels	Forest Land	- 168	- 56
Rabbits[a]	Forest Land and Open Land	- 90	- 30
Doves[b]	Open Land	+ 317	+ 150
Quail[b]	Open Land	+ 317	+ 21
Waterfowl (Migratory)	Forest Land	- 168	- 8

[a] Loss computed only on land taken up by channels. The seeded berms and spoil will be as good or better as the habitat existing with preproject conditions.

[b] After a period of about 3 years, the open land condition will change to a brush type-habitat causing its usefulness to diminish.

The red-cockaded woodpecker, an "endangered" species, is found near Channel M-7. Construction of this channel will be terminated 500 years from the closest nest tree. Stopping construction at this distance will avoid disturbing the woodpeckers' habitat. Research on red-cockaded woodpeckers has determined that the territory of a pair varies from 25 to 42 acres.[5]

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[5] Gilbert T. Crosby, "Home Range Characteristics of the Red-Cockaded Woodpecker in North-Central Florida," The Ecology and Management of the Red-Cockaded Woodpecker (Tallahassee: Tall Timbers Research Station, May 1971), p. 67.

IMPACTS

The impacts of this project on the "endangered" or "status-undetermined" species that could possibly occur or be occassional visitors will be minimal. However, the cumulative impact of this project and many similar projects is further deleting habitat for these animals.

Areas of Natural Beauty - The installation of project measures in a manner which will be least damaging to fish and wildlife will maintain and, in some cases, improve areas of natural beauty. Pecan and various species of oak trees which will be planted will increase aesthetic values. Leaving selected trees on the channel berm will interrupt the open view creating a varied scene of natural beauty. Excavation from only one side of the channels will leave the opposite side in its natural state. Shaping the spoil according to design and revegetating channel side slopes, berms, and spoil on the disturbed side will present a pleasant green belt appearance. Improved agricultural production as a result of the project will present attractive pastoral scenes.

Economic and Social

The economic base of the watershed, agriculture, will be enhanced. The project will increase agricultural development which in turn will stimulate the business of processors and sellers of agricultural products as well as other goods. The economy of the area will be enhanced by the higher salaries of those presently employed and those hired to do the additional work.

The gross sales of farm products are expected to increase by approximately 20 percent. Expenditures for production inputs required to obtain these higher gross sales are expected to increase by approximately 11 percent.

The greater level of protection and consequent reduced cost of production and increased quality of products will give farmers an incentive to increase production inputs. They will buy better quality seed and will use more fertilizer and lime. It is expected that they will spend an additional $45,000 buying 750 tons of fertilizer annually which will be necessary to attain the higher yields of the future. There will be increases in expenditures for fuel and other petroleum products which will be used in harvesting and hauling the product to market. This will stimulate economic activity within the watershed as well as the surrounding areas. More jobs will be created in the processing and service industries. The value of property will increase which will provide a higher tax base. Thus, the parish will have more funds to develop health, recreational, educational, and other needed facilities.

Installation of the project will create about 37 man-years of local labor for a 3-year period. The expenditure of $877,500 for the installation of land treatment measures will create an additional 25 man-years

of labor over a 5-year period. Operation and maintenance will provide 1 man-year annually of local labor for the life of the project.

The project will help slow the trend of decreasing number of farms and increasing size. With the project, optimum sized, labor-saving equipment will be more efficiently used on the farms. This and other factors which will decrease cost, and increase yields and net returns will be more competitive with other industries which will slow the out-migration trend.

The average annual overall net farm income will increase about $2,500 per farm. With this increase and more stable income, the farmer may improve his house or buy a better automobile. Farmers will be able to afford better dental and health care, more insurance, better clothes, and other amenities of life for their families. The increased farm output will enable farm managers to pay employees higher wages which in turn will help improve living conditions.

The problems of watershed residents caused by flooded roads will be reduced. Schoolbuses will be able to travel their scheduled routes more regularly which will improve shcool attendance. The general public will be better able to utilize the roads for farming operations and marketing, and for commuting to places of employment and business during wet periods. Nuisance damages to residents will be reduced.

Local traffic patterns will be interrupted temporarily during the replacement of bridges and culverts resulting in inconveniences to the people involved. Detour routes will be available such that no one will be deprived of access to their destination. Noise levels will increase at the construction sites. Increases in turbidity will occur downstream temporarily until the exposed areas are revegetated.

Benefits will accrue from the financial and technical assistance made available for the installation of the project. This will bring outside monetary resources into the community and will provide an opportunity to use goods, services, and labor from the local area. The use of unemployed or under-employed local labor will be needed during project installation and throughout project life for normal operation and maintenance.

Local secondary benefits will accrue after the installation of project measures. The values added to the immediate products and services as a result of activities stemming from or induced by the project will enhance the overall local economy. The increased production of goods stemming from the project will place new demands on the processing, transporting, and marketing industries within the area. Because the only processing facility is a grain elevator, the effects on this type facility will be less than on the transporting and marketing sectors. Processors, business establishments, and other individuals not directly benefited will profit from increased sales of their agriculturally

associated goods and products. Suppliers of the needed materials and services required to make possible the benefits expected from installation of the project will realize an increased net income. Increased production of goods and services induced by the project will tend to stimulate local economic activity. Because most of the products are processed outside the watershed, economic activity in the region will also be increased.

Archaeological, Historical, and Scientific - There are no properties listed in the National Register of Historical Places that will be affected by installation of structural measures. This project will have no effect on any known archaeological or historical sites.

FAVORABLE ENVIRONMENTAL IMPACTS

A. The average annual agricultural floodwater damages will be reduced 73 percent.

B. A total of 32,900 acres of cropland and pastureland will directly benefit from the combined program of land treatment and structural measures.

C. An additional 4,000 acres of cropland and pastureland will benefit from accelerated land treatment and rotation systems.

D. Flood damages to 10 miles of gravel and hard-surfaced roads will be reduced.

E. Sediment delivered to Calcasieu River as a result of sheet erosion will be reduced by 41 percent (29,227 tons/year to 17,165 tons/year).

F. Sheet erosion will be reduced about 12 percent or 10,148 tons per year.

G. Outlets for the town of Kinder will provide a 3-year level of protection from overbank flooding. Nuisance damages to residences will be reduced.

H. The creation of 36 acres of permanent water will result in additional water for agricultural uses and fish and wildlife habitat.

I. The effectiveness of the low-level dam on Calcasieu River for ground-water recharge will be aided by the reduction of sediment.

J. An estimated 165 farmers will directly benefit from the installation of project measures and land treatment. The remaining 35 farmers will benefit from accelerated land treatment. These measures will also provide benefits for the 430 family members. Farm employees will also benefit. The average annual net farm income will increase.

K. Temporary increases of mourning doves, bobwhite quail, and nongame species will result from the conversion of forest to open land along channels.

L. The project will create about 62 man-years of local labor over the installation period; operation and maintenance will create 1 man-year annually of local labor over the project life.

M. About 2,500 acres of forest land will be adequately treated.

ADVERSE ENVIRONMENTAL IMPACTS

A. Construction will result in approximately 1,310 tons of sediment being delivered to Calcasieu River during project installation causing a temporary local increase in turbidity.

B. Sixty acres of Type 1 wetlands (seasonally flooded hardwoods) will be adversely affected by channel construction.

C. Occasional periods of noxious aquatic weed growth may occur in the permanent water created by the six structures for water control (weirs).

D. About 150 acres of cropland, 187 acres of wooded channel banks, and 123 acres of forest land not presently occupied by channels, berms, and spoil will be disturbed during construction. This will result in some reductions of both game and nongame animals.

E. Timber losses on forest land required for project installation will amount to 237 acres.

F. Crop and pasture losses on open land required for project installation will amount to 150 acres.

ALTERNATIVES

Land Treatment Only

The major land treatment practices and measures which could be installed are conservation cropping system, crop residue management, land smoothing, ditching, pasture and hayland management, pasture and hayland planting, wildlife wetland habitat management, and wildlife upland habitat management. Approximately 5,600 acres of land not dependent on improvement of drainage outlets could be adequately treated with the preceding "going" and "accelerated" conservation land treatment measures.

This alternative would reduce erosion to about the same level as with the planned project because rice-pasture rotation would not be converted to rice-soybean rotation.

Pesticides reaching downstream areas would be less since most pesticides are attached to soil particles. Nutrients (N, P, K) transported downstream would be less. Wildlife habitat would be improved with those practices which involve management of this resource.

The installation cost of the measures necessary to accomplish this would amount to $316,800. Although some desirable environmental effects, such as sediment reduction, could be obtained with this alternative, monetary losses from reduced crop production, road flooding, and undesirable living conditions would remain unchanged.

Leveed Floodways, Pumps, and Land Treatment

This alternative would include leveed floodways to prevent headwater flooding and pumps to remove excess rainfall from the protected areas. Channels would be required inside the leveed areas to deliver water to the pumps. Additional land required for installation of this system would total about 1,850 acres. Of this total, about 1,500 acres would be committed to levees, berms, and channels. This would result in a loss of 900 acres of agricultural land, 400 acres of forest land, and 200 acres of wooded channel banks. Additional land committed to floodways would total about 350 acres. This would require about 90 acres of forest land, 140 acres of wooded channel banks, and 120 acres of agricultural land. Pumps would increase the noise level, cause pollution from fuel spillage, and could cause excessive erosion and turbidity at discharge points.

Shortages of fuel or electric power for pump motors could cause flooding. Reductions in flooding and improvements in drainage from this approach would be about the same as those for the planned project except for that land committed to project works. The estimated total installation cost of this alternative is $9,500,000. The estimated average annual operation and maintenance cost is $500,000.

The going and accelerated land treatment program would include conservation measures to adequately treat 19,650 acres of land and partially treat an additional 17,000 acres. This would cost $935,100. The conservation measures needed to treat this area would include but not be limited to conservation cropping system, crop residue management, land smoothing, drainage field ditches, pasture and hayland management, forest management, pasture and hayland planting, wildlife wetland habitat management, and wildlife upland habitat management. These measures would be installed singly or in combination as needed. These measures would reduce erosion, improve water quality, improve the tilth of the soil, and reduce wetness.

Floodwater Retarding Structure and Land Treatment

The flat terrain upstream from the problem areas provides no site for floodwater retarding dams. The only portion of this alternative that could be applied is land treatment. Its effectiveness would be similar to that under Land Treatment Only.

Using Land for Purposes More Tolerant to Poor Drainage Conditions

Alternative crops and cropping systems were investigated that would be tolerant of the excess soil moisture condition. This alternative was studied to determine if other cropping systems and land uses could be developed that would not require structural measures to reduce inadequate drainage and flooding.

Although wet conditions at certain times hinder production of rice, it is the most water-tolerant crop known which could be grown in the area. It also produces the highest economic returns. Certain pasture grasses, although their production is lowered by excessive wetness, are more tolerant of excess water than soybeans. However, it is uneconomical, in many instances, to establish permanent pastures in rice-pasture rotation since this rotation is on a 2-to 3-year cycle. Consequently, pastures substituted for soybeans would consist mainly of the low producing rice-rotational pastures, consisting mostly of volunteer grasses, which existed before soybeans were introduced.

Another crop which could be introduced in rotation with rice is crawfish. The production of this crustacean fits in well with rice culture. Rice levees constructed to hold irrigation water also serve as embankments which can turn ricefields into crawfish ponds. Plant stubble and chaff left after the rice harvest serves as food for the crawfish. Irrigation systems used for rice production serve as a source of water the the ponds.

No commercial crawfish are grown in Allen Parish. In other rice areas where crawfish are grown, several drawbacks have been experienced. Fields on which insecticides have been used for control of rice insects have failed to produce crawfish.[1/] Crawfish culture has not advanced to the point where consistent yields can be obtained each year of production. Some years yields go as high as 800 to 1,000 pounds per acre, and then for some unexplainable reason, production during the next season will drop to as low as 200 pounds per acre. Research in crawfish production was initiated in 1964 at Louisiana State University. Until research progresses to the point where methods are developed to consistently produce high yields, the use of crawfish as a rotatable with rice will remain relatively low.

Another factor which reduces the desirability of crawfish production is harvesting. Soybean production requires the same machinery as rice, while crawfish production is much more labor intensive. Crawfish harvest usually begins in January or February, which makes it cold, wet work for the first 2 or 3 months. Unless a farmer's operation is small enough to allow him to do all the work or is located in an area where commercial fishermen reside, he will usually experience difficulty in finding labor for harvest. If crawfish production were introduced on a large scale in the watershed, this problem would be greatly magnified.

The crawfish industry is steadily growing in southern Louisiana, but it is still relatively small and unorganized when compared to rice, soybeans, and cattle. No large central marketing facilities have been developed. Several relatively small dealers or buyers, located about 70 miles from the watershed, are the main distributors for the localized markets.

Channel Work and Land Treatment

Various sizes and lengths of channels were studied to determine effects of 1.5-year, 3-year, or 5-year level of protection. The effects of each of these levels of protection were evaluated for

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1/ Carl H. Thomas, "A Preliminary Report on the Agricultural Production of the Red-Swamp Crawfish (Procambarus clarki) (Girard) in Louisiana Rice Fields," Proceedings of the Seventeenth Annual Conference Southeastern Association of Game and Fish Commissioners, (Columbia: Southeastern Association of Game and Fish Commissioners, 1963), p. 184.

without- and with-project conditions. Their effects on wildlife habitat and animal populations and preproject and postproject standing crops of fish are exhibited in the tabulation on the following page.

The evaluation units correspond to the drainage areas of the channel groups identified in the Physical Resources section of the ENVIRONMENTAL SETTING. The evaluation units are delineated and labeled on Appendix C, Project Map. The same three levels were used for each evaluation unit because the intensity of land use is about the same throughout the project area. The effects of the 1.5-year and 5-year levels were unacceptable alternatives and are further explained in this section. The selected 3-year level on which the project is based is explained in the ENVIRONMENTAL IMPACT section.

The types of land treatment measures to be installed would be the same as those discussed under the Floodproofing and Land Treatment alternative. The 3-year and 5-year level of protection would provide the benefits previously described; however, the outlet limitation of the 1.5-year level of protection would reduce the effectiveness of the land treatment program and the amount of land to be adequately treated.

Smaller Channels. Providing a 1.5-year level of protection by channel work would require about 72 miles of channel work with 976,500 cubic yards of excavation. The total installation cost would be $1,540,700. The annual cost, including operation and maintenance, would be about $136,500; the damage reduction would by 47 percent.

Land committed to channel, berm, and spoil areas would change in the following manner:

(1) Land within channels would increase from 249 to 310 acres.

(2) Land used for berms would increase from 25 to 186 acres.

(3) Land used for spoil would increase from 106 to 273 acres.

Land used for channels and berms will increase because of channel enlargement and leaving wider berms to serve as maintenance access. Land occupied by spoil will increase because existing and project-created spoil will not be spread for channels in most cases.

The land treatment program under this level of protection would include the installations of the necessary going and accelerated conservation measures to adequately treat 9,200 acres, and install some land treatment on an additional 8,000 acres. This would cost $437,500.

HABITAT ACRES AND POPULATIONS OF WILDLIFE SPECIES AND EFFECTS FOR THE THREE LEVELS OF PROTECTION

				Changes by Alternatives					
				1.5-Yr. Level of Protection		3.0-Yr. Level of Protection		5.0-Yr. Level of Protection	
	Animal	Pre-Project							
Species	Acre Ratio	Acres	Total Animals	Acres 1/	Animals 1/	Acres 1/	Animals 1/	Acres 1/	Animals 1/
Dove	1:3	36,900	12,300	+291	+97	+317	+105	+335	+112
Quail	1:15	75,750	3,655	+291	+19	+317	+ 21	+335	+ 22
Squirrel	1:3	38,850	12,950	-146	-49	-168	- 56	-188	- 63
Deer	1:50	38,850	777	-146	- 3	-118	- 3	-188	- 4
Rabbit	1:3	75,750	25,250	- 57	-19	- 90	- 30	-115	- 38
Waterfowl (Migratory)	1:20	75,850	3,790	-146	- 7	-168	- 8	-188	- 9

1/ Indicated change as a result of project.

ESTIMATED STANDING CROPS OF FISHES

	Pre-Project		Post-Project	
Name	Pounds Per Acre	Total Pounds	Pounds Per Acre	Total Pounds
Calcasieu River	100	22,000	100	22,000
Farm Ponds (Bass-Bluegill)	125	5,000	125	5,000
Farm Ponds (Channel Catfish)	1,500	34,500	1,500	34,500
Intermittent Channels	15	600	15	600
Channels (Water behind Structures for Water Control)	0	0	15	540
		62,100		62,640

ALTERNATIVES

Type of habitat in which channels are located was categorized according to examples shown in the Wildlife Resources section. Channels located on cropland or pastureland which had no trees or brush on the berms and spoil were categorized as open land channels. Channels located in cropland or pastureland having narrow strips of trees or brush on the berms and spoil were categorized as wooded channel bank. Channels located in forests were categorized as such. Land used for channels, berms, and spoil within these three categories would change in the following manner:

(1) Open land acres occupied would increase from 98 to 225 acres.

(2) Wooded channel bank acres occupied would increase from 169 to 320 acres.

(3) Forest land acres occupied would increase from 114 to 224 acres.

The loss in wooded channel bank acreage to channel and berm would decrease wildlife habitat for certain species. The acres of spoil disturbed in the wooded channel banks and forest land would return to tree cover through natural plant succession and some tree plantings. Out of the 769 acres required for channels, 81 acres would require clearing only, and 688 acres would require excavation

Larger Channels. Providing a 5-year level of protection by channel work would require 75 miles of channel work with 1,520,800 cubic yards of excavation. The total installation cost would be $2,207,000. The annual cost, including operation and maintenance, would be $185,100. The damage reduction would be 83 percent.

Land committed to channel, berm, and spoil areas would change in the following manner:

(1) Land within channels would increase from 249 to 368 acres.

(2) Land used for berms would increase from 25 to 221 acres.

(3) Land used for spoil would increase from 106 to 325 acres.

Land used for channels and berms will increase because of channel enlargement and leaving wider berms to serve as maintenance access. Land occupied by spoil will increase because existing and project-created spoil will not be spread for channels in most cases.

Land used for channels, berms, and spoil within the three categories, open land, wooded channel bank, and forests, would change in the following manner:

(1) Open land acres occupied would increase from 98 to 267 acres.

(2) Wooded channel bank acres occupied would increase from 169 to 381 acres.

(3) Forest acres occupied would increase from 114 to 266 acres.

Construction for a 5-year level of protection would encroach on the normal feeding area of the red-cockaded woodpeckers in the watershed.

The loss in wooded channel bank acreage to channel and berm would decrease wildlife habitat for certain species. The acres of spoil disturbed in the wooded channel banks and forest land would return to tree cover through natural plant succession and some tree plantings. Out of the 914 acres required for channel work, 114 acres would require clearing only, and 800 acres would require excavation.

The land treatment program would include the installation of the necessary going and accelerated conservation measures to adequately treat 19,650 acres and install conservation measures on an additional 17,000 acres. The cost is estimated to be $935,100. The measures to be installed include the same features discussed under Floodproofing and Land Treatment.

No Project

The "No Project" alternative would include a continuation of the going land treatment program. At present, 30 percent of the total land treatment measures needed to achieve and report Land Adequately Treated have been applied at a cost of about $950,000. There are a total of 5,600 additional acres of land that would respond to an accelerated land treatment program without a structural measures project. However, without this type of project, there will be no acceleration of the conservation program. For this reason, only 2,800 acres would be adequately treated at a cost of approximately $158,400.

With the "No Project" alternative the water problem will continue to exist. Local Sponsors do not have sufficient funds to finance the installation of a complete channel system. Only certain channels would be worked and no orderly, planned procedure would be followed. Appurtenant measures needed to control erosion and sediment would not be installed. The limited funds and piecemeal fashion in which channel work would be installed would give little consideration to minimizing damages to forest land and aquatic ecosystems. However, the pursuit of this alternative would insure continuation of the existing fish and wildlife habitat in areas where this piecemeal approach would not be used. If the project is not installed, net annual benefits of about $483,600 will be foregone.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

Prairies in the southeastern portion and forest on the remainder of the watershed were the major vegetative patterns when the settlers first came to the area. The prairies were first used as open cattle range and small crop plots. Homesteading caused the land to be divided into relatively small tracts. The increase of crop production on the prairie gradually caused the open range to disappear. Most of the forested areas remained in trees because they furnished lumber for construction and wood for fuel. They were also the areas least suited for cultivation. Forest and agricultural acreages are not expected to change in the future.

The soils presently being used for cropland are in Capability Class IIIw. This is in the range of capabilities suitable for cropland. Since returns from crops are higher than those from pasture or forest products, cropland will remain in that use in the future. Although some of the land presently in forest is in capabilities suitable for cropland, the likelihood of it being converted to that use is low because extensive drainage improvements would be required. Most of the forested areas are managed for timber and expected to remain in that use.

The level of drainage and flood protection provided by the project will improve soil conditions which will allow higher crop yields, elimination of unnecessary costs, and better quality products. These conditions will induce farmers to apply needed measures and practice better conservation. The increased application of land treatment measures will insure sustained production for future generations. Since the major land use is now agriculture and is expected to be so in the future, the project is compatible with the long-term use of the land and water. If the project is maintained as planned, it should continue to be effective in conserving land and water resources after its designed 50-year life unless new crop varieties and farming methods are developed which would require a different level of protection.

The Kinder Watershed is in the Calcasieu Water Resource Subregion of the Lower Mississippi Region. Federal agencies have not done any work on the Calcasieu River which would affect this watershed. The Louisiana Department of Public Works in 1971 installed a low-level weir in Calcasieu River in the vicinity of Kinder. This structure raised the permanent water level to 28 feet mean sea level. It does not influence flood flows or cause land use changes. This same agency during the 1960's participated in the modification of certain other water courses including Bayou Serpent (Channel M-2), Bayou

Alligator (Channel L-2C), and portions of Kinder Ditch (Channels M-1 and L-1F). Bayou Alligator is adequate in size and capacity. Bayou Serpent is also adequate below the lower watershed boundary. The additional channel work, which will be accomplished by Kinder Watershed Project, on the upper end of Bayou Serpent and Kinder Ditch should satisfy the requirements for flood prevention and drainage in the watershed area.

One soil and water conservation district and parts of others cover the entire Calcasieu River Basin. Adequate land treatment has been established on about 40 percent of the total needs. About 11 percent of the land area in the Calcasieu Water Resource Subregion is in some stage of development, planning, or requesting assistance under Public Law 566. Approximately 15 percent of the total land area in the Lower Mississippi Water Resource Region is covered by Public Law 566 projects which are either installed or approved for planning. The status of Public Law 566 projects for flood control can be observed in the tabulation on page 98.

STATUS OF PUBLIC LAW 566 PROJECTS

Item	Projects Installed		Projects Approved for Planning		Project Applications Received		Total	
	(No.)	(Acres)	(No.)	(Acres)	(No.)	(Acres)	(No.)	(Acres)
Calcasieu Water Resource Subregion								
Louisiana	2	56,400	2	197,000	2	52,700	6	306,100
TOTAL	2	56,400	2	197,000	2	52,700	6	306,100
Lower Mississippi Water Resource Region								
Louisiana	6	296,590	21	2,819,270	7	531,820	34	3,647,680
All Other States	19	501,044	40	6,946,689	Not Tabulated		59	7,447,733
TOTAL	25	797,634	61	9,765,959	7[a]	531,820[a]	93[a]	11,095,413[a]

a/ Does not contain applications received for states other than Louisiana.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

About 36 acres of land within ephemeral and intermittent flow channels will be committed to permanent water. Structures for water control (weirs) will be located in the channel rights-of-way so no additional land will be required.

Land presently taken up by channels, berms, and spoil comprises a total of 381 acres. Land use of the 381 acres presently in channels, berms, and spoil is as follows: 98 acres in open land, 114 acres in forest land, and 169 acres in wooded channel banks. After construction is complete, land taken up by channels, berms, and spoil will comprise a total of 841 acres. A breakdown of the 841 acres will be as follows: 339 acres in channels, 204 acres in berms, and 298 acres in spoil.

Channels have to be maintained and kept clear of obstructions in order to function as planned. As a result, channels will preclude the use of 339 acres of land for any other purpose for at least the life of the project. Grasses and forbs will be allowed to grow in the channels and on the berms. One side of the channels in forest land will not be disturbed during construction nor during the life of the project. Large vegetation such as trees will not be allowed to grow on the berms and in the channels on the side being disturbed since maintenance equipment access will be necessary. Spoil areas in the forest land will be allowed to grow back with trees. Use of spoil in the open land will not be precluded for any particular purpose.

The total monetary value which will be expended for project installation, including land treatment and structural measures, amounts to $2,857,500. The expenditure of labor and capital needed for project installation, once expended, cannot be reversed.

CONSULTATION WITH APPROPRIATE AGENCIES AND OTHERS

General

On Thursday, December 21, 1967, 13 people met in Kinder to discuss and formulate the proposed Kinder Watershed application for assistance under Public Law 566. A number of persons representing a broad cross-section of the watershed community, participated. The watershed application was endorsed and the group requested the Allen Parish Police Jury, the Calcasieu Soil and Water Conservation Districts, and the Kinder Drainage District No. 2 sponsor the project.

The Allen Parish Police Jury, Kinder Drainage District No. 2, and Calcasieu Soil and Water Conservation District made an application for assistance on January 15, 1968. The town of Kinder, Kinder Rotary Club, and Allen Parish Farm Bureau endorsed the application for assistance. The Louisiana Soil and Water Conservation Committee approved the application on February 20, 1968.

Authorization to provide planning assistance under provisions of Public Law 566 was requested October 20, 1970. The authorization was granted January 25, 1971.

Interested parties and agencies were notified of this authorization for planning on February 1, 1971. Thirteen agencies acknowledged receipt of the notification and offered their assistance.

A work outline on the Kinder Watershed was developed on March 23, 1971. Representatives of the Louisiana Wild Life and Fisheries Commission, Soil Conservation Service, and local Sponsors participated in the development. A preliminary investigation map was mailed on March 24, 1971 to the regional office of the Environmental Protection Agency.

The Kinder Drainage District No. 2 issued a news release and notified all known interested parties of a public meeting to be held at the Kinder City Hall April 26, 1971. Thirty-three people attended this hearing. All persons present were given an opportunity to express their views concerning this project and related land resource problems. All who voiced opinions supported project installation based on preliminary investigations. Many of the people expressed concern for the urgent need to proceed with planning and construction as soon as possible. As a result of the public hearing, maps of the watershed project area were posted at the Kinder Rice Dryer and the Oberlin Soil Conservation Service office. This afforded the public a further opportunity to review the area and express concerns for planning needs.

These recommendations were consolidated and used as a basis for investigation and project planning.

A field review of the fish and wildlife resources was held on August 5, 1971. Participating in this review were representatives of Louisiana Wild Life and Fisheries Commission, U.S. Fish and Wildlife Service, and Soil Conservation Service. During this review, a number of suggestions were made concerning possible damages or areas adversely affected by the project measures. The Soil Conservation Service requested that the U.S. Fish and Wildlife Service and Louisiana Wild Life and Fisheries Commission identify specific damages or adversely affected areas so specific project measures would be developed. The U.S. Fish and Wildlife Service made three specific recommendations by letter dated August 25, 1971. These recommendations were:

1. Channel work on M-7 and M-8 be terminated where they enter woodlands.
2. All possible precautions be taken to decrease sediment and turbidity damages.
3. All possible means be used to leave as much woody vegetation along channels where feasible.

Excavation on Channel M-7 was terminated at the woodlands and Channel M-8 was eliminated. The other two recommendations have been followed in their entirety. The Louisiana Wild Life and Fisheries Commission representative made no such recommendations in his reply.

The Kinder Watershed boundaries were amended in March 1972 to include an area of 8,400 acres in Jefferson Davis Parish. The Jefferson Davis Parish Police Jury and the Gulf Coast Soil and Water Conservation District requested that inadequate drainage and flood problems be investigated in this area and the plan include measures for their alleviation.

The U.S. Forest Service, U.S. Fish and Wildlife Service, and Louisiana Wild Life and Fisheries Commission were informed of this amendment to the watershed on March 14, 1972. A map showing proposed project channels which the local Sponsors had requested was transmitted to these agencies on April 12, 1972.

On December 5, 1972, Dan S. Martin and Associates, Inc., city planning consultants, inquired about the Kinder Watershed Project. This firm is preparing a Comprehensive Plan for the town of Kinder. Information concerning the watershed project and its effects on drainage in Kinder was requested. This information was transmitted to the mentioned firm on December 15, 1972. The information was supplemented at their request.

The Allen Development Association at its annual meeting February 7, 1973 unanimously passed a resolution urging completion

of the plan for Kinder Watershed. This association pointed out the immediate need for action to solve the drainage and flooding problems.

Another public information meeting was held on March 25, 1973. The meeting, having been announced in the local and area newspapers, was well attended.

In order to obtain viewpoints from a different source on environmental concerns, professional services were obtained from Coastal Environmentals, Inc. Employees of this corporation have either M.S. or Ph.D. degrees in geography (flood plain management), zoology, marine science, chemistry, geology, and geo-chemistry. Their primary expertise is environmental evaluation and environmental impact statement preparation. A team representing interests in geography, biology, geology, and zoology reviewed the work plan and environmental impact statement and made suggestions for improvement.

Copies of the preliminary draft work plan and environmental impact statement were mailed to local, State, and Federal agencies and concerned groups for the informal field review. A public meeting was held on July 31, 1974 to present informal field review comments and the responses or changes resulting from these comments. Persons in the audience were given an opportunity to question and comment on the material presented.

The Louisiana Historical Preservation and Cultural Commission and the Curator of Anthropology at Louisiana State University were contacted to obtain the locations of places of historical or archaeological importance. The Forest Service assisted in the survey of forest land needs and in the watershed plan formulation.

The following agencies have been asked to comment on the draft environmental statement.

Department of the Army
Department of Commerce
Department of Health, Education, and Welfare
Department of the Interior
Department of Transportation
Environmental Protection Agency
Advisory Council on Historic Preservation
Federal Power Commission
Governor's Council on Environmental Quality
Louisiana Commission on Intergovernmental Relations
Office of Equal Opportunity, USDA
Louisiana Department of Highways
Louisiana Cooperative Extension Service
Louisiana Department of Public Work
Department of Geography and Anthropology, Louisiana State University
Louisiana Forestry Commission
Louisiana Historical Preservation and Cultural Commission
Louisiana Farm Bureau
Louisiana State Parks and Recreation Commission
Louisiana State Soil and Water Conservation Committee
Louisiana Wild Life and Fisheries Commission
Wildlife Management Institute

CONSULTATION

Audubon Society
Friends of the Earth
Sierra Club
The Izaak Walton League of America
Wildlife Federation
Student Government Association
University of New Orleans
Ecology Center of Louisiana, Inc.
Lafayette Area Sportsmen Club
Environmental Defense Fund
Environmental Impact Assessment Project
National Resources Defense Council, Inc.

Dr. C. R. Brownell
Mr. Clifford M. Danby
Mr. Leonard K. Knapp, Jr.
Mrs. Angeline B. Le Luca
Mrs. Helga Cerniuk
Mr. Andrew Guidry
Professor William Futrell
Mrs. James Norris
Mrs. William E. Woolsey
Mr. Earl J. Higgins
Mr. James Whelan

Discussion and Disposition of Each Comment on Draft Statement

Each issue, comment, or suggestion for improvement is summarized and a response is given on the following pages. Comments are numbered where agencies have supplied multiple comments. The original letters of comment appear in appendix G.

U.S. Department of Transportation - Federal Highway Administration

Comment: We note that the Louisiana Department of Highways is one of the reviewing agencies for this project, and that you intend to coordinate with them the replacement or modification of one bridge and seven culverts on State and Federal-aid highways. The Highway Department's involvement should begin early in the design phase of the project so that this work can be coordinated with their own projects and to insure compliance with current standards and specifications.

Response: Concur. The following statement included on page 15, paragraph 5, lines 6 through 9 of Environmental Impact Statement and page 76, paragraph 1, lines 1 through 9 of the Work Plan. All bridge and culvert changes will be coordinated with responsible agencies at the construction design stage. This will insure compliance with their standards and specifications.

U.S. Department of the Interior, Geological Survey

Comment: We have reviewed the subject statement and work plan and believe them to be reasonably adequate and accurate in their evaluation of the environmental impact of the proposed action, with respect to hydrology.

Response: None

Department of the Army, New Orleans District, Corps of Engineers

We have reviewed the environmental impact statement and offer the following general comments for your consideration:

Comment 1: The environmental impact statement should include discussions on the following topics:

a. The adequacy of drainage outlets at the downstream ends of the project.

b. The increased rates of runoff generated by channel improvements and the effect on peak flows and stages in the Calcasieu River.

c. The effect of the channel improvements in the Bayou Serpent and Bayou Alligator drainage areas on their outlet in terms of increased flows and stages. If the flows cause stages which would cause flood damages in the outlets from the project, these adverse impacts should be discussed also.

Response 1: a. This is discussed in the last paragraph on page 70 and the tabulation in shown on the top of page 71 of the environmental impact statement. This is also discussed and shown on page 81 of the work plan.

b. This is discussed in the first paragraph on page 71 of the environmental impact statement and second paragraph on page 81 of the work plan.

c. Same response as 1.a.

Comment 2: The geologic implications of changes in drainage capacity and amounts of sediments carried by streams, areas and rates of erosion or deposition, channels and flow, flooded or leveed areas, spoil disposal, and turbidity and other factors are extremely significant and must be evaluated.

Response 2: This is discussed on page 68, paragraph 3, lines 5 through 9; page 75, last paragraph; and page 76 through first paragraph, page 79 in the environmental impact statement. This is also discussed and shown on page 86 through 91 of the work plan.

Comment 3: It is probable that permits will be required from the Corps for some of the proposed channel work. We suggest that your representatives arrange a meeting with our representatives of the Permit Section of our Operations Division to discuss this need.

Response 3: The following was inserted as the second full paragraph on page 9 of the environmental impact statement and page 71 of the work plan:

Construction permits will probably be required by the U.S. Corps of Engineers (Engineering Regulation No. 1165-2-302). These permits will be obtained, as necessary, by the Sponsors prior to construction of the associated structural measures.

U.S. Environmental Protection Agency

Comment: The following comment is for your consideration in preparing the final statement:

We would suggest that the statement discuss the environmental impacts associated with alteration, modification or reconstruction of existing facilities such as bridges, culverts, utility lines, and fences. The location of major facility changes, particularly bridge alterations, should also be provided. This information would be helpful in evaluating the total impacts of the project.

We have classified the Draft Environmental Impact Statement as LO-1. Specifically, we have no objections to the proposed project as described in the statement at this time. Your agency has presented sufficient information on the environmental impacts of the project and its alternatives. The classification and the date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Response: The following was inserted on page 85 and 97, respectively, fifth full paragraph of the environmental impact statement and the work plan:

Local traffic patterns will be interrupted temporarily during the replacement of bridges and culverts resulting in inconveniences to the people involved. Detour routes will be available such that no one will be deprived of access to their destination. Noise levels

will increase at the construction sites. Increases in turbidity will occur downstream temporarily until the exposed areas are revegetated.

State of Louisiana - Department of Art, Historical and Cultural Preservation

Comment: This Department does not know of any sites on the National Register of Historic Places or being actively nominated to the National Register which would be effected by the proposed project.

Response: None

Louisiana Forestry Commission

Comment: This is to advise that we have no objection to the Environmental Impact Statement for the Kinder Watershed.

Response: None

Louisiana Health and Human Resources Administration

Comment: The Kinder Watershed Work Plan and the Draft Environmental Impact Statement have been reviewed by this office for probable effects upon insect vector control.

It is our opinion that implementation of the project as planned should reduce the breeding habitats of mosquitoes of several species including both floodwater and permanent water varieties.

Response: None

LIST OF APPENDIXES

Approved by *Alton Mangum*

Alton Mangum
State Conservationist

Date October 4, 1974

APPENDIX A - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Kinder Watershed, Louisiana

(Dollars)

Evaluation Unit	Average Annual Benefits 1/						Average Annual Cost 2/	Benefit Cost Ratio
	Damage Reduction	More Intensive Land Use	Drainage	Redevelopment	Secondary	Total		
I	98,100	20,000	89,700	6,500	35,000	249,300	48,800	5.1:1
II	4,000	900	3,800	200	1,100	10,000	1,600	6.3:1
III	64,000	13,200	59,800	2,700	28,000	167,700	27,700	6.5:1
IV	73,700	14,800	66,000	5,600	23,800	183,900	48,500	3.5:1
V	6,000	1,300	5,700	400	2,200	15,600	3,400	4.6:1
Project Administration	xxx	xxx	xxx	xxx	xxx	xxx	12,900	
GRAND TOTAL	245,800	50,200	225,000	15,400	90,100	626,500	142,900	4.4:1

1/ Current normalized prices for crop and pasture, 1974 prices for all other values.

2/ 1974 prices amortized for 50 years at 5.625-percent interest.

May 1974

APPENDIX B

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Books

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U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE, ALEXANDRIA, LOUISIANA

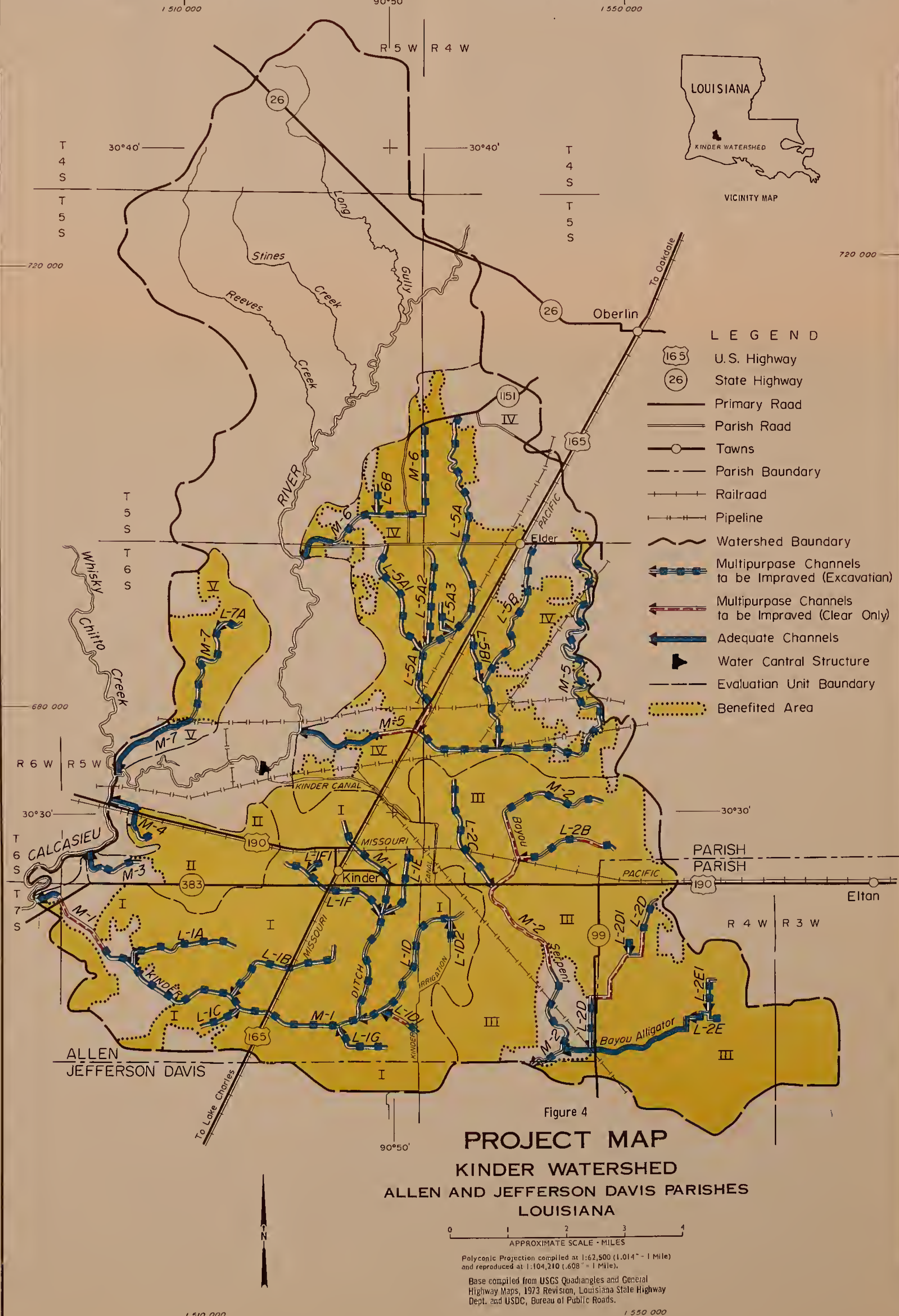

Figure 4

PROJECT MAP

KINDER WATERSHED

ALLEN AND JEFFERSON DAVIS PARISHES

LOUISIANA

REVISED JULY 1974 4-R-33664

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APPENDIX D

INTERPRETATIONS OF WATER QUALITY PARAMETERS

CHLORIDE (Cl)

Water quality is dependent upon the use(s) of the water. The following data is not all inclusive but summarizes water quality criteria for some common uses.

Chloride is found in natural waters. It may originate from natural mineral origin or from (1) seawater contamination of underground water supplies, (2) salts spread on roads and bridges, (3) human or animal sewage, and (4) industrial effluents such as those from paper works, water softening plants, oil wells, and petroleum refineries. It is recommended that the chloride concentration not exceed a monthly average of 125 mg/l and that the maximum concentration not exceed 250 mg/l. The primary concern in setting these standards is economic damage rather than public health. For public supplies, water with a chloride concentration of less than 125 mg/l is rated "acceptable"; between 125 and 250 mg/l "doubtful"; and over 250 mg/l "unsatisfactory." For industrial use, the corresponding limits are: less than 50 mg/l, 50-175 mg/l, and over 175 mg/l, respectively.

"The Aquatic Life Advisory Commission of ORSANCO concluded that it is impossible to generalize on the effects of chloride concentrations on aquatic life, for each mixture of chlorides with other salts must be evaluated separately. Hart, _et al_., cite data indicating that among U.S. waters supporting a good fish fauna, ordinarily the concentration of chlorides is below 3 mg/l in 5 percent; below 9 mg/l in 50 percent; and below 170 mg/l in 95 percent of such waters."1/

In summary, based on a literature review, it appears that the following chloride concentrations will not normally be deleterious to the specified use: (1) Domestic water supply, 125 mg/l; (2) Industrial water supply, 50 mg/l; (3) Irrigation water, 100 mg/l; and (4) Stock and wildlife, 1500 mg/l.

1/ Jack Edward McKee and Harold V. Wolf, _Water Quality Criteria_, publication No. 3-A, (2nd edition; Sacramento: State Water Quality Board, 1963) p. 161.

COLOR (APPARENT)

Color of natural waters is derived from substances in solution or from materials in colloidal state.2/ The standard unit used to measure color is the amount of color produced by adding 1 mg/l of platinum to water. Results are expressed as units of color. "Color in excess of 50 units may limit photosynthesis and have a deleterious effect upon aquatic life, particularly phytoplankton and the benthos."3/

DISSOLVED SOLIDS

Water without some dissolved solids does not occur in nature and will not support aquatic life. Natural water contains an endless variety of dissolved materials in concentrations that will vary widely from place to place and from time to time. Some commonly occurring dissolved solids are: carbonates; bicarbonates; chlorides; sulfates; phosphates; nitrates of calcium, magnesium, sodium, and potassium; and traces of iron, manganese, and other elements. Many of these dissolved solids are essential to aquatic organisms for their growth, reproduction, and general well-being. All dissolved solids, which are necessary to aquatic organisms, have a range of concentrations that are both essential and tolerable. The tolerance levels for any one dissolved solid vary depending on the concentrations and kinds of other substances present. In general, the concentrations of dissolved materials in natural freshwaters are below the optimum for maximum productivity. In many instances, the addition of any of a large number of substances would be beneficial. However, the addition of what may be considered a beneficial substance must be planned and controlled so that it will not exceed favorable limits.4/ It is believed that the total dissolved solids in a water course should not be increased more than one-third of the concentration it has under natural conditions.

Dissolved solids may influence the toxicity of heavy metals and organic compounds to fish and other forms of aquatic life. This is a result primarily of the antagonistic effect of hardness-producing metals. "It has been reported that among inland waters

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2/ George K. Reid, Ecology of Inland Waters and Estuaries, (New York: Reinhold Publishing Corporation, 1961), p. 101.

3/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 48.

4/ Ibid., p. 39.

in the United States supporting a good mixed fish fauna, about 5 percent have a dissolved solids concentration under 72 mg/1, about 50 percent under 169 mg/1, and about 95 percent under 400 mg/1."5/

In summary, based on a literature review, dissolved solids up to the following limits should not interfere with the indicated use: (1) Domestic water supply, 1,000 mg/1; (2) Irrigation water, 700 mg/1; (3) Stock and wildlife water, 2,500 mg/1; and (4) Freshwater fish and aquatic life, 2,000 mg/1.

HARDNESS

Hardness or calcium carbonate determinations are made with the Titration Method and expressed as mg/1. "In natural waters, hardness is a characteristic of water which represents the total concentration of just the calcium and magnesium ions expressed as calcium carbonate."6/ Hardness in water may be caused by the natural accumulation of salts from contact with soil and geological formations, or it may enter from direct pollution by industrial wastes. Hardness of waters is not considered a problem for fisheries in Louisiana. As a guide for interpreting, hardness is less than 40 mg/1 is considered soft water, 90-150 mg/1 is medium, while above 150 mg/1 is considered hard water.

NITROGEN, AMMONIA (NH_3)

Nitrogen is present in natural waters in the form of inorganic nitrogen compounds such as ammonia. Nitrogen (ammonia) determinations are made by the Nessler method and expressed mg/1. The chemical state of nitrogem is dependent on the overall limnology of the waterway since nitrogen (ammonia) is quite unstable. In most freshwaters, the concentrations of this inorganic compound are relatively slight, but nevertheless, very important in determining the productivity of a given community. "Rivers known to be unpolluted have low ammonia concentrations, generally less than 0.2 mg/1 as N." 7/

NITROGEN, NITRATE (NO_3)

Nitrogen (nitrate) determinations are made by the Cadmium Reduction Method and expressed in mg/1. "Nitrogen (nitrate) usually occurs in

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5/ McKee and Wolf, op. cit., p. 183.

6/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Chemical Analysis for Water Quality, 1967, p. 18-1.

7/ McKee and Wolf, op. cit., p. 132.

relatively small concentrations in unpolluted freshwater, the world average being 0.30 ppm."8/ Under normal conditions the amount of nitrate in solution at a given time is determined by metabolic processes in the body of water, i.e., production and decomposition of organic matter. High nitrate concentrations in effluents, and water stimulate the growth of plankton and aquatic weeds. By increasing plankton growth and the development of fish food organisms, nitrates indirectly foster increased fish production.

"Hart, et
United States waters supporting a good fish life, ordinarily 5 percent have less than 0.2 mg/l of nitrates; 50 percent have less than 0.9 mg/l; and 95 percent have less than 4.2 mg/l." 9/

OXYGEN (DISSOLVED) (O_2)

The dissolved oxygen content can be determined with a Hach Dissolved Oxygen test kit and expressed in mg/l. The content of dissolved oxygen in the water depends on several factors such as the temperature and salinity of the water, amount of organic material present, light present, and the abundance of phytoplankton. "For a diversified warm-water biota, including game fish, dissolved oxygen concentrations should be above 5 mg/l, assuming normal seasonal and daily variations are above this concentration. Under extreme conditions, however, they may range between 5 and 4 mg/l for short periods during any 24-hour period, provided that the water quality is favorable in all other respects."10/

OXYGEN SATURATION (percent)

Water is said to be saturated with oxygen when it contains all the dissolved oxygen it can hold at a given atmospheric pressure, temperature, and dissolved solids concentration. The difference between the actual oxygen content and the amount that could be present is called the saturation deficit. If the water contains more oxygen that should normally be present, it is said to be supersaturated.

8/ Reid, *op, cit.*, p. 187

9/ McKee and Wolf, *op. cit.*, p. 225.

10/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 44

The ability of water to hold oxygen decreases with increases in temperature, dissolved solids, and reduction of atmospheric pressure.11/ Natural waters are seldom at equilibrium or exactly saturated with dissolved oxygen. The reason for this is that temperatures and atmospheric pressure are always changing and physical, chemical, bio-chemical, and/or biological activities are continually utilizing or producing dissolved oxygen. Oxygen saturation, like pH and alkalinity, is only a measurement, but it indicates the amount of potential oxygen actually present. High or low oxygen saturation values usually indicate high or low concentrations of dissolved oxygen, but this is not always the case. For instance, seawater at 15°C. and 100 percent saturation will contain only 6 ppm dissolved oxygen while freshwater at 15°C. and 100-percent saturation will contain 11 ppm dissolved oxygen.12/

pH

The pH can be determined with a Hach test kit. The symbol "pH" is used to designate the logarithm (base 10) of the reciprocal of the hydrogen-ion concentration. If the value is less than 7, then the pH is considered acid and the lower the number the more acid. Values above 7 indicate a basic solution with the larger number being more basic. "In most productive, fresh, natural water, the pH falls in the range between 6.5 and 8.5 (except when increased by photosynthesis activity)."13/ "Bass and bluegill can live from 4.6 to 11, growth and reproduction at either extreme is poor. The optimum level for growth for these fish is 6.5 to 8.5."14/

PHOSPHATE, ORTHO (PO_4)

The phosphate (ortho) determinations were made by the Ascorbic Acid Method which gives a reading in mg/l. This is a test for just

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11/ Charles W. Keenan and Jesse H. Wood, General College Chemistry (2nd ed.; New York, Evanston; London: Harper and Row, Publishers, 1957).

12/ George K. Reid, Ecology of Inland Waters and Estuaries (New York: Reinhold Publishing Corporation, 1961).

13/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 40.

14/ U.S. Department of Agriculture, Soil Conservation Service, "Water Quality and Fish Culture," Biology Technical Note XII, 1968.

phosphates (ortho) and does not indicate total phosphate content. The major sources of phosphorus entering freshwaters are domestic sewage effluents (including detergents), animal and plant processing wastes, fertilizer and chemical manufacturing spillage, various industrial effluents, and to a limited extent, sediment materials in agricultural runoff. "Phosphorus is stored in plankton and bottom sediments. Very little of this stored phosphorus reenters the water. Evidence from the addition of fertilizers to fresh ponds and from what is known about the eutrophication of lakes by sewage supports the view that phosphorus plays a major role in production."15/ "Most natural waters contain relatively low levels of phosphorus (0.01 to 0.05 mg/l) in the soluble state during periods of significant productivity."16/ "Optimum growth of all organisms studies in cultures can be obtained on concentrations from 0.09 to 1.8 mg/l of phosphorus, while a limiting effect on all organisms will occur in phosphorus concentrations from 0.009 mg/l downward. The lower limit of optimum range of phosphorus concentration varies from about 0.018 to about 0.09 mg/l; and the upper limit from 8.9 to 17.8 mg/l."17/

SODIUM (Na)

Sodium is a very active metal which does not occur free in nature. Nevertheless, sodium compounds make up 2.8 percent of the earth's crust. Most sodium salts are extremely soluble in water. Because of this, sodium that is leached from soil or dishcarged into streams by industries will normally remain in solution. Sodium is the cation of many salts used in industry and is one of the most common ions in process wastes.

Sodium is drinking water may be harmful to people suffering from cardiac, renal, and circulatory diseases. Drinking water of good quality may contain up to 115 mg/l of sodium, but it is recommended that a limit of 10 mg/l be established for drinking water and 50 mg/l for industrial water. Water used by livestock and wildlife should not have sodium concentrations greater than 2,000 mg/l.

15/ U.S. Department of the Interior, Federal Water Pollution Control Administration, The Practice of Water Pollution Biology, Division of Technical Support, 1969, p. 281.

16/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Chemical Analysis for Water Quality, 1967, p. 15-1.

17/ S.P. Chu, " The Influence of the Mineral Composition of the Medium on the Growth of Planktonic Algae," Journal of Ecology, 31 (2), 1943, pp. 109-148.

"Of the United States" waters supporting a good fish fauna, ordinarily the concentration of sodium plus potassium is less than 6 mg/l in about 5 percent, less than 10 mg/l in about 50 percent, and less than 85 mg/l in about 95 percent."18/

SPECIFIC CONDUCTANCE

Specific conductance is an indication of the ion concentration in water. Natural freshwater usually contains relatively small amounts of ions in solution, but in water polluted by brines and various chemical wastes the ion concentration may rise to levels that are harmful to living organisms because of the increase in osmotic pressure.

All substances in solution collectively exert osmotic pressure on the organisms living in it. Most aquatic species can tolerate some changes in the amount of ions naturally present if the total miximum concentration is not exceeded. Wide variations in total salinity (specific conductance) or in the concentration of individual salts can have profound effects upon the aquatic fauna, resulting in the elimination of some or all aquatic species. When the osmotic pressure is sufficiently high because of ions in solution (high specific conductance), water will be drawn from the gills and other delicate external tissues causing considerable damage or even death. High concentrations of many types of pollutants of freshwater present this danger apart from any other toxic or corrosive effects they may have.19/

"Ellis has concluded that conductances in excess of 1,000 mhos x 10^{-6} at 25°C. in most types of streams are probably indicative of the presence of acid or salt pollution of various kinds. Ellis has also found that a specific conductance of 4,000 x 10^{-6} mhos at 25°C. is approximately the upper limit of ionizable salts tolerated by fish.

Using Ellis' data, Hart, et al., have reported that among United States' waters supporting a good fish fauna, about 5 percent have a specific conductance under 50 x 10^{-6} mhos at 25°C., about 50 percent under 270 x 10^{-6} mhos, and about 95 percent under 1,100 x 10^{-6} mhos."20/

18/ McKee and Wolf, op. cit., p. 259.

19/ Ibid., p. 94.

20/ Ibid., p. 274.

SULFATE (SO_4)

Sulfate content can be analyzed by the Turbidimetria Method and expressed in mg/l. Sulfates occur naturally in waters as a result of leachings from gypsum and other common minerals. "Sulfate is ecologically important in natural waters in several ways. It is apparently necessary for plant growth; short supply of the material can inhibit the development of phytoplankton populations and, therefore, production. Sulfur is important in protein metabolism and is supplied to the organism originally sulfate."21/ "In U.S. waters that support good game fish populations, 5 percent of the waters contain less than 11 mg/l of sulfates, 50 percent less than 32 mg/l, and 95 percent less than 90 mg/l. Experiments indicate that water containing less than 0.5 mg/l of sulfate will not support growth of algae."22/

SULFIDE (S)

Sulfides are determined by the Methylene Blue Method and expressed in mg/l. Sulfides in water are a result of the natural processes of decomposition, sewage, and industrial wastes such as those from oil refineries, tanneries, pulp and paper mills, textile mills, chemical plants, and gas manufacturing facilities.

The toxicity of solutions of sulfides toward fish increases as the pH value is lowered, i.e., the H_2S or HS, rather than the sulfide ion, appears to be the toxicity principle.23/ "Concentrations in the range of less than 1.0 mg/l to 25.0 mg/l are lethal in 1 to 3 days to freshwater fish."24/

SUSPENDED SOLIDS

Suspended solids consist normally of sediment, organic detritus, bacteria, and plankton in natural waters. The standard method of determining the suspended solids content of a water source is by use of the Photometric Method which gives a direct reading of mg/l or

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21/ George K. Reid, *op. cit.*

22/ McKee and Wolf, *op. cit.*, p. 276.

23/ *Ibid.*, p. 277.

24/ U.S. Department of the Interior, Federal Water Pollution Control Administration, *Water Quality Criteria*. (Washington: U.S. Government Printing Office, 1972), p. 88.

suspended solids. The test is not intended to measure the concentrations of specific chemical substances in water, but rather gives an empirical estimate of water quality by measuring the amount of suspended foreign materials present. Suspended solids may kill some species of fish and shellfish if exposed to concentrations of 100-200 mg/l for long-term periods.25/

TEMPERATURE

Temperature is an important, and sometimes critical, water quality parameter. Water temperature changes can result from natural climatic phenomena or from man's activities. For instance, "Stream temperatures may be increased by irrigation practices and the return of agricultural drainage."26/

Water temperature changes resulting from man's activities are generally upward. Increases in temperature usually cause some or all of the following: (1) lower the solubility of dissolved oxygen, thereby reducing the availability of this essential gas, (2) increase the rate of metabolism and respiration and thus the oxygen demand of fish and other aquatic life; therefore, the oxygen demand is increased while the oxygen supply is decreased, (3) intensify the toxicity of many substances, (4) favor the growth of sewage fungus and the putrefaction of sludge deposits which are detrimental to desirable fishes, (5) there is a maximum and minimum temperature that each species can tolerate; therefore, changes in temperature may cause a change in species' composition; (fish tolerance to temperature extremes and changes vary with fish species, prior acclimatization, oxygen availability, and the synergistic effects of other pollutants), and (6) changes in temperature also affect lower aquatic life. Temperature is one of the environmental features that determines which organisms will thrive, diminish, or be eliminated.27/

To maintain a well-rounded warm-water fishery population, the following recommendations were made on temperature extremes and temperature increases:

1. "During any month of the year, heat should not be added to a stream in excess of the amount that will raise the temperature of the water (at the expected minimum daily flow for that

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25/ McKee and Wolk, *op. cit.*, p. 280.

26/ *Ibid.*, p. 283.

27/ *Ibid.*, p. 285.

month) more than 5°F. In lakes and reservoirs, the temperature of the epilimnion should not be raised more than 3°F. above that which existed before the addition of heat of artificial origin. The increase should be based on the monthly average of the maximum daily temperature.

2. The normal daily and seasonal temperature variations that were present before the addition of heat, because of other than natural causes, should be maintained.

3. The recommended maximum allowable temperatures are not to exceed the maximum temperatures of the preferred fish species and their associated biota."28/

TOTAL ALKALINITY

Alkalinity is not a specific polluting substance, but rather a combined effect of several substances and conditions. It is actually a measurement of the power of a solution to neutralize hydrogen ions. It is usually expressed in terms of an equivalent amount of calcium carbonate, $CaCO_3$. Alkalinity is caused by the presence of carbonates, bicarbonates, hydroxides, and to a lesser extent by borates, silicates, phosphates, and organic substances. Total alkalinity is related to pH, but high pH values do not necessarily mean you have high total alkalinity values. High total alkalinity values indicate a buffered water which would be resistant to rapid, wide changes in pH. For instance, water with a pH of 7 can have a low total alkalinity value, whereas a buffered water with a pH of 6 can have a higher total alkalinity value.

Alkalinity itself is not considered harmful to humans, but it is usually associated with high pH, hardness, and excessive dissolved solids, all of which may be harmful. For industrial use, high total alkalinity can be either beneficial or detrimental depending upon the type of industry.

Water to be used by livestock and wildlife for drinking should have a total alkalinity below 170 mg/l. Animals drinking water with higher values develop diarrhea. For fish and other aquatic life, alkalinity is not lethal to fully developed fish if the concentration is not enough to raise the pH well above 9.

28/ U.S. Department of the Interior, Federal Water Pollution Control Administration, Water Quality Criteria, (Washington: U.S. Government Printing Office, 1972), p. 42.

The best waters for supporting a productive, diversified fish population and other aquatic life are those with pH values between 7 and 8 and having a total alkalinity of 120 mg/l or more. This alkalinity acts as a buffer to help prevent sudden changes in pH which could be harmful to fish and other aquatic life.29/

For waterfowl, waters with relatively high bicarbonate alkalinity produce more high value food plants that those with low such values. "Few waters with less than 25 mg/l bicarbonate alkalinity can be classed among the better waterfowl habitat."30/ Bicarbonate increases the amount of CO_2 available for plant use in photosynthesis.

TURBIDITY

Turbidity is the term used to describe the degree of translucence produced in water by suspended particulate matter. Excessive turbidity reduces light penetration into the water and, therefore, reduces photosynthesis by phytoplankton organisms, attached algae, and submersed vegetation. Turbidity calibrations were originally based on the Jackson Candle Turbidimeter with results expressed in Jackson Turbidity Units (JTU). As the Jackson equipment lacks sensitivity below 25 JTU (most treated water ranges from 0 to 5 JTU), the meter scale calibrations have been based on a uniform milky polymer called formazin, which allows accurate calibrations over a wide range. The results are expressed as Formazin Turbidity Units (FTU) and are equivalent to the Jackson Units. According to Buck "maximum production of 161.5 lbs./acre occured in farm ponds where the average turbidity was less than 25 FTU. Between 25 and 100 FTU fish yield dropped 41.7 percent to 94 lbs/acre, and in muddy ponds where turbidity exceeded 100 FTU, the yield was only 29.3 lbs/acre, or 18.2 percent of clear ponds."31/

29/ McKee and Wolf, *op. cit.*, p. 129.

30/ U.S. Department of the Interior, Federal Water Pollution Control Administration, *Water Quality Criteria*, (Washington: U.S. Government Printing Office, 1972), p. 94.

31/ *Ibid.*, p. 46.

APPENDIX E - FIGURES

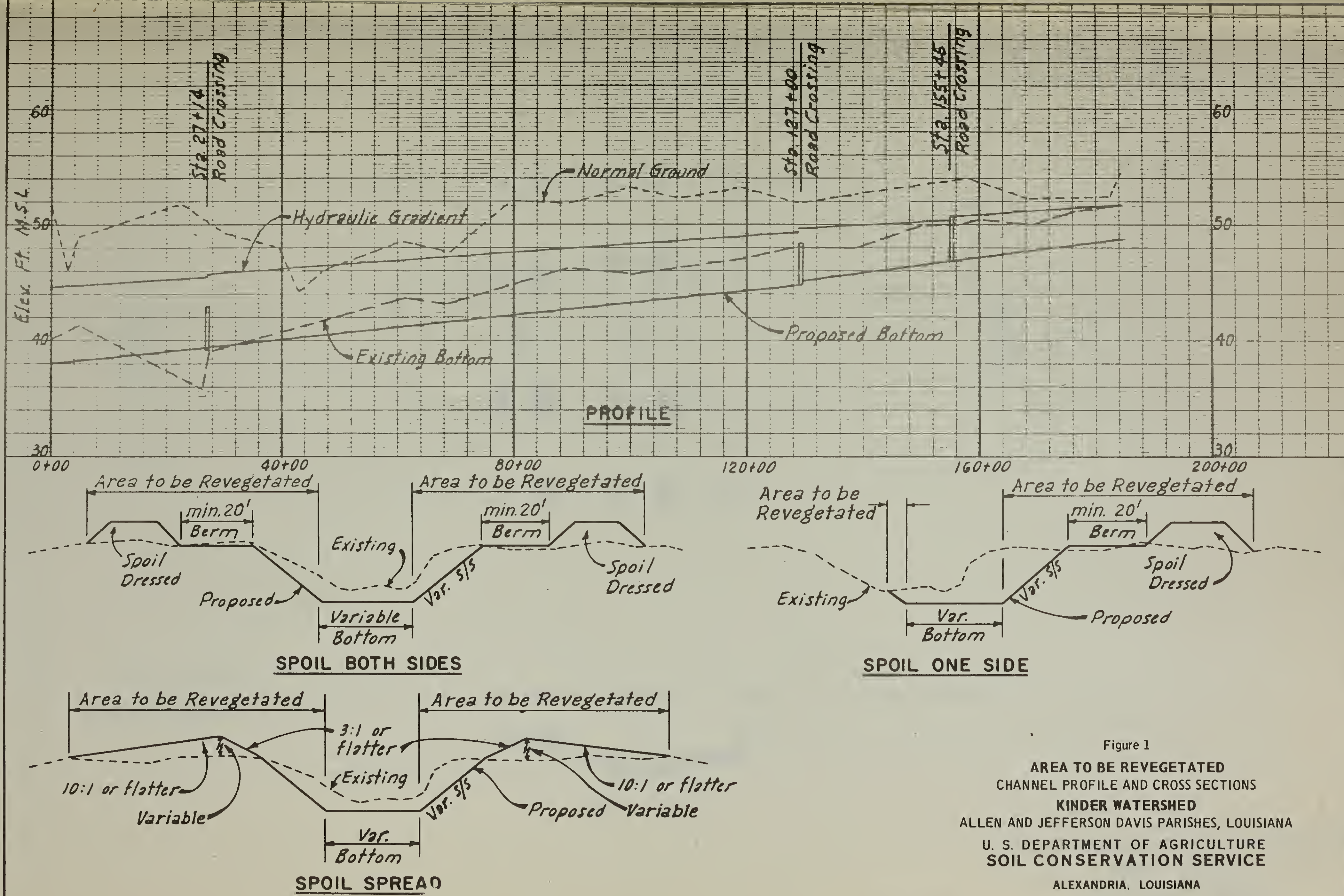


Figure 1

AREA TO BE REVEGETATED

CHANNEL PROFILE AND CROSS SECTIONS

KINDER WATERSHED

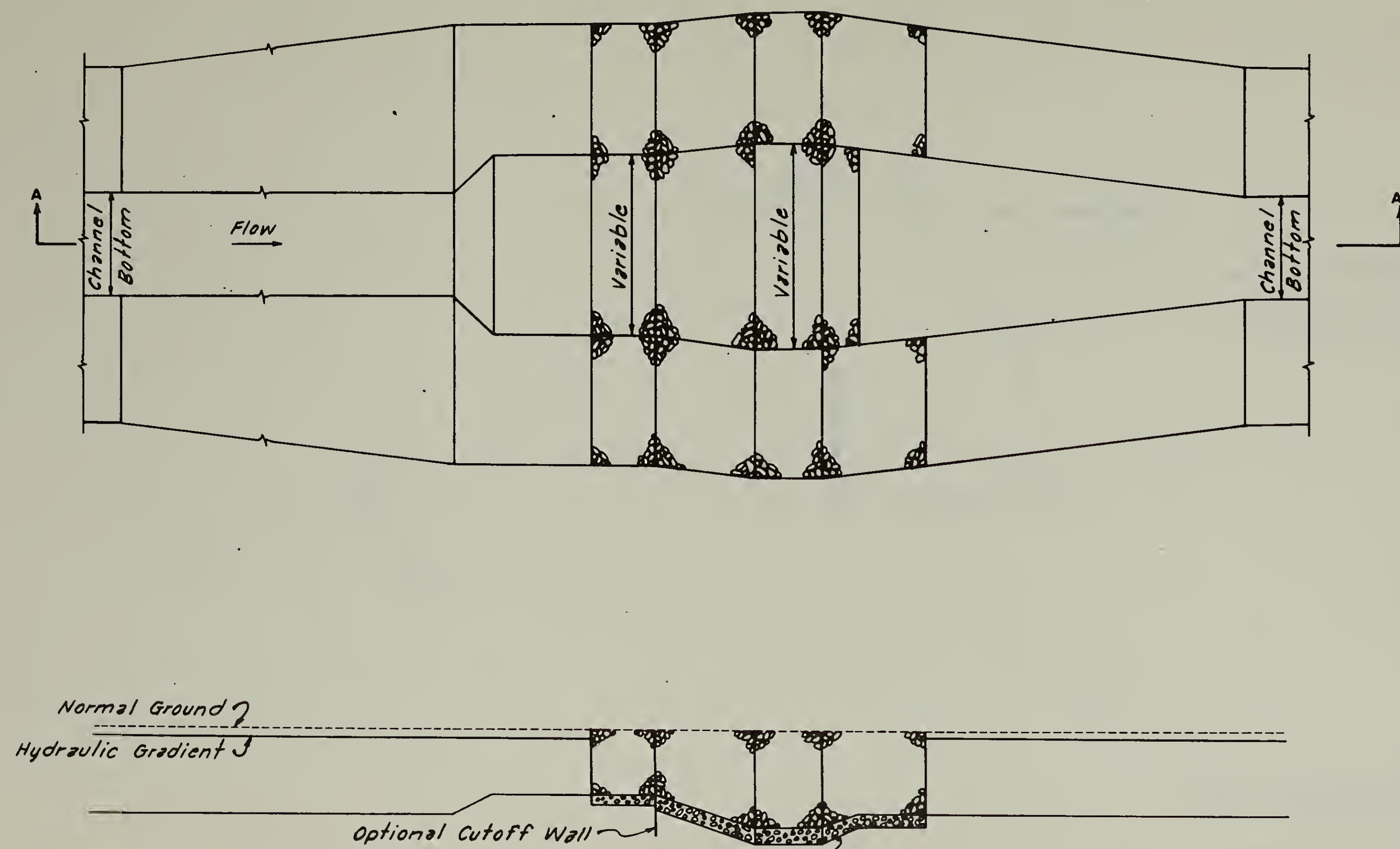
ALLEN AND JEFFERSON DAVIS PARISHES, LOUISIANA

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

ALEXANDRIA, LOUISIANA

FEBRUARY 1974 4-R-33,666



SECTION A—A

FIGURE 2
TYPICAL STRUCTURE FOR WATER CONTROL (WEIR)
KINDER WATERSHED
ALLEN AND JEFFERSON DAVIS PARISHES, LOUISIANA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

Revised 7-74

FEBRUARY 1974 4-E-38,865

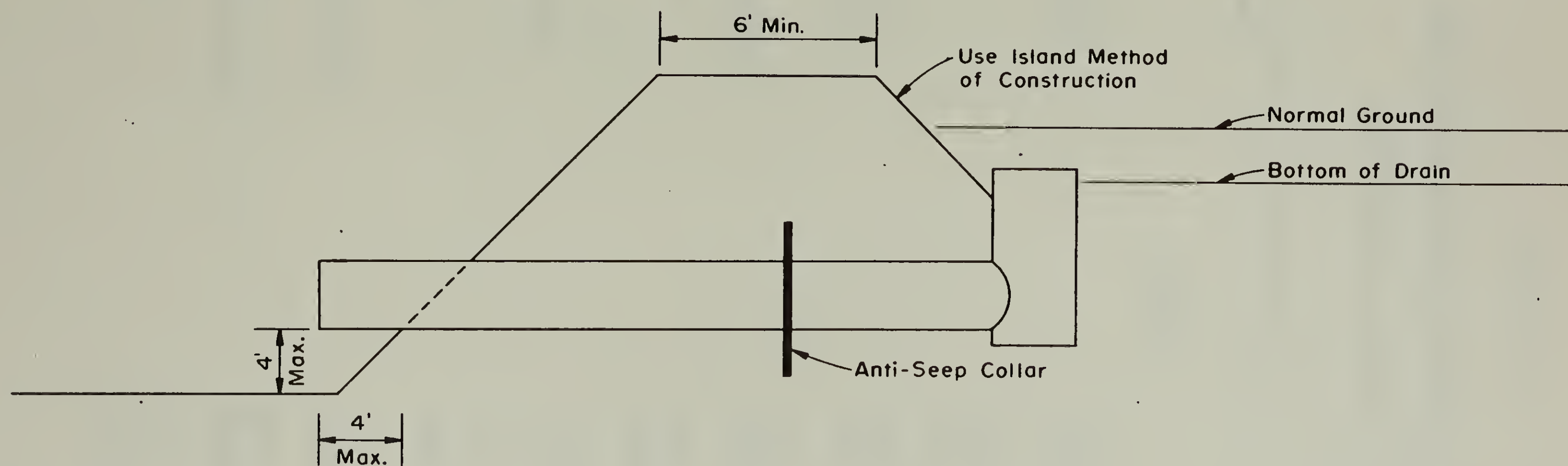


Figure 3

TYPICAL STRUCTURE FOR WATER CONTROL (PIPE DROP)

KINDER WATERSHED

ALLEN AND JEFFERSON DAVIS PARISHES, LOUISIANA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALEXANDRIA, LOUISIANA

Revised 7-74 FEBRUARY 1974 4-R-33,667

USDA-SCS FORT WORTH, TEX 1974

APPENDIX F

COMMON AND SCIENTIFIC NAMES OF ANIMALS MENTIONED IN THIS REPORT

The animals are listed alphabetically by the common name and followed by the scientific name.

BIRDS

Bachman's warbler
Vermivora buchmanii

Barred owl
Strix varia

Belted kingfisher
Megaceryle alcyon

Blue jay
Cyanocitta cristata

Blue-winged teal
Anas discors

Bobwhite quail
Colinus virginianus

Brown thrasher
Toxostoma refum

Common crow
Corvus brachyrhynchos

Downy woodpecker
Dendrocopos pubescens

Eastern bluebird
Sialia sialis

Gadwall
Anas strepera

House Sparrow
Passer domesticus

Louisiana heron
Hydranassa tricolor

Mallard
Anas platyrhynchos

Mourning dove
Zenaidura macroura

Osprey
Pandion haliaetus

Pintail
Anas acuta

Red-cockaded woodpecker
Dendrocopos borealis

Southern bald eagle
Haliaeetus leucocephalus

Wild turkey
Meleagris gallopavo

Wood duck
Aix sponsa

MAMMALS

Beaver
Castor canadensis

Bobcat
Lynx rufus

Cottontail rabbit
Sylvilagus floridanus

Fox squirrel
Scirus niger

Gray fox
Urocyon cinereoargenteus

Gray squirrel
Scirus carolinensis

Mink
Mustela vison

Nine-banded armadillo
Dasypus navemeinctus

Nutria
Myocastor coypus

Opossum
Didelphis virginiana

Raccoon
Procyon lotor

Striped skunk
Mephitis mephitis

Swamp rabbit
Sylvilagus aquaticus

White-tailed deer
Odocoileus virginianus

REPTILES AND AMPHIBIANS

Bullfrog
Rana catesbeiana

Common snapping turtle
Chelydra serpentina

Copperhead
Agkistrodon contortrix contortrix

Five-lined skink
Eumeces fasciatus

Green anole
Anolis carolinensis carolinensis

Ground skink
Lygosoma laterale

Kingsnake
Lampropeltis getulus holbrooki

Texas coral snake
Micrurus fulvius tenere

Three-toed box turtle
Terrapene carolina triungius

Red-eared turtle
Pseudemys scripta elegans

Smooth softshell turtle
Trionyx muticus

Southern dusky salamander
Desmognathus fuscus auriculatus

Southern leopard frog
Rana pipiens sphenocephala

Spring peeper
Hyla crucifer

Squirrel treefrog
Hyla squirella

Stinkpot turtle
Sternothaerus adoratus

Western cottonmouth
Agkistrodon piscivorous leucostoma

FISHES

Alligator gar
Lepisoteus spatula

American eel
Anguilla rostrata

Banded pigmy sunfish
Elassoma zonatum

Bigmouth buffalo
Ictiobus cyprinellus

Black bullhead
Ictalurus melas

Black crappie
Pomoxis nigro-maculatus

Black spotted topminnow
Eundulus elivaceus

Black striped topminnow
Fundulus notatus

Blue catfish
Ictalurus furcatus

Bluegill
Lepomis macrochirus

Bowfin
Amia calva

Longnose gar
Lepisosteus ceseus

Madtom
Schilbeodes gyrinus

Mosquitofish
Gambusia affinis

Paddlefish
Polyodon spathula

Pirate perch
Aphredoderus sayanus

Brook silverside
Labidesthes sicculus

Channel catfish
Ictalurus punctatus

Chestnut lamprey
Ichthyomyzon castaneus

Flathead catfish
Pylodictis olivaris

Flier
Centrarchus macropterus

Freshwater drum
Aplodinotus grunniens

Gizzard shad
Dorosoma cepedianum

Grass pickerel
Esox Americanus vermiculatus

Green sunfish
Lepomis cyanellus

Largemouth bass
Micropterus salmoides

Longear sunfish
Lepomis megolotis

Spotted bass
Micropterus punctulatus

Spotted gar
Lepisosteus oculatus

Spotted sucker
Minytrema melanops

Spotted sunfish
Lepomis punctatus

Striped mullet
Mugil cephalus

River carpsucker
Carpiodes carpio

Shortnose gar
Lepisosteus platostomus

Shovelnose sturgeon
Scaphirhynchus platorynchus

Skipjack herring
Alosa chrysochloris

Smallmouth buffalo
Ictiobus bubalus

Southern brook lamprey
Ichthyomyzon gagei

Threadfin shad
Dorosoma petenense

Warmouth
Lepomis gulosus

White crappie
Pomoxix annularis

Yellow bass
Morone mississippiensis

Yellow bullhead
Ictalurus natalis

APPENDIX G

Letters of Comments Received on the
Draft Environmental Statement

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION SIX
750 Florida Boulevard
Baton Rouge, Louisiana 70801

December 9, 1974

IN REPLY

Draft Environmental Impact Statement
Kinder Watershed Project

Mr. Alton Mangum
State Conservationist
Soil Conservation Service
P. O. Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

Your November 25, 1974 letter, transmitted for our review a copy of the draft environmental statement for the captioned project.

We note that the Louisiana Department of Highways is one of the reviewing agencies for this project, and that you intend to coordinate with them the replacement or modification of one bridge and seven culverts on State and Federal-aid highways. The Highway Department's involvement should begin early in the design phase of the project so that this work can be coordinated with their own projects and to insure compliance with current standards and specifications.

We appreciate having had the opportunity to review the statement and have no other comment.

Sincerely yours,

fr. M. C. Reinhardt
Division Engineer

United States Department of the Interior

GEOLOGICAL SURVEY

Water Resources Division
P.O. Box 66492
Baton Rouge, Louisiana 70806

January 14, 1975

Mr. Alton Mangum
State Conservationist
Soil Conservation Service
P.O. Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

We replied on December 30, 1974, to the request for review of the Kinder Watershed EIS originated by our headquarters office. A copy of that reply is attached.

Sincerely yours,

FOR THE DISTRICT CHIEF

Max J. Forbes, Jr.
Hydrologist

Enclosure

G. H. Davis, WRD
Attention: G. H. Chase
Reston, Virginia Mail Stop 407

December 30, 1974

District Chief, WRD
Baton Rouge, Louisiana

Review of draft environmental statement and work plan for Kinder Watershed, Allen and Jefferson Davis Parishes, Louisiana (ER-74/1455)

We have reviewed the subject statement and work plan and believe them to be reasonably adequate and accurate in their evaluation of the environmental impact of the proposed action, with respect to hydrology.

FOR THE DISTRICT CHIEF

Max J. Forbes, Jr.
Hydrologist

cc:
Regional Hydrologist, CR, WRD
Lakewood, Colorado
District reading file

MJForbes:as 12-30-74

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT. CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160

IN REPLY REFER TO
LMNPL-RE

22 January 1975

Mr. Alton Mangum
State Conservationist
US Department of Agriculture
Soil Conservation Service
Post Office Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

Reference is made your letter of 25 November 1974 requesting our comments on the draft environmental statement (EIS) for the Kinder Watershed, Louisiana.

We have reviewed the EIS and offer the following general comments for your consideration:

1. The EIS should include discussions on the following topics:

a. The adequacy of drainage outlets at the downstream ends of the project.

b. The increased rates of runoff generated by channel improvements and the effect on peak flows and stages in the Calcasieu River.

c. The effect of the channel improvements in the Bayou Serpent and Bayou Alligator drainage areas on their outlet in terms of increased flows and stages. If the flows cause stages which would cause flood damages in the outlets from the project, these adverse impacts should be discussed also.

2. The geologic implications of changes in drainage capacity and amounts of sediments carried by streams, areas and rates of erosion or deposition, channels and flow, flooded or leveed areas, spoil disposal, and turbidity and other factors are extremely significant and must be evaluated.

3. It is probable that permits will be required from the Corps for some of the proposed channel work. We suggest that your representatives arrange a meeting with our representatives of the Permit Section of our Operations Division to discuss this need.

Thank you for the opportunity to review this draft EIS.

Sincerely yours,

E. R. Heiberg III

E. R. HEIBERG III
Colonel, CE
District Engineer

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1600 PATTERSON
DALLAS, TEXAS 75201
January 10, 1975

Mr. Alton Mangum
State Conservationist
Soil Conservation Service
P. O. Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

We have reviewed the Draft Environmental Impact Statement, Kinder Watershed, Allen and Jefferson Davis Parishes, Louisiana. The proposed project provides for watershed protection, flood prevention and drainage in a two parish area. The project action includes conservation land treatment and channel work. Construction will be implemented on 55 miles of existing and 10 miles of new channels. Also, appurtenant water control structures (weirs and pipe drops) will be constructed.

The following comment is for your consideration in preparing the final statement:

We would suggest that the statement discuss the environmental impacts associated with alteration, modification or reconstruction of existing facilities such as bridges, culverts, utility lines and fences. The location of major facility changes, particularly bridge alterations, should also be provided. This information would be helpful in evaluating the total impacts of the project.

We have classified the Draft Environmental Impact Statement as LO-1. Specifically, we have no objections to the proposed project as described in the statement at this time. Your agency has presented sufficient information on the environmental impacts of the project and its alternatives. The classification and the date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the attachment. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and on the adequacy of the impact statement at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft Environmental Impact Statement. Please send us two copies of the Final Environmental Impact Statement at the same time it is sent to the Council on Environmental Quality.

Sincerely yours,

Arthur W. Busch
Regional Administrator

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

STATE OF LOUISIANA

Department of Art, Historical and Cultural Preservation

OLD STATE CAPITOL, BATON ROUGE, LOUISIANA 70801
(504) 389-5086

EDWIN EDWARDS
GOVERNOR

JAY R. BROUSSARD
DIRECTOR

January 9, 1975

Mr. Alton Mangum
State Conservationist
Soil Conservation Service
P. O. Box 1630
Alexandria, Louisiana 71301

USDA-SCS-EIS-WS-(ADM)-75-1-(D)-LA
Kinder Watershed
Allen and Jefferson Davis Parishes

Dear Mr. Mangum:

This Department does not know of any sites on the National Register of Historic Places or being actively nominated to the National Register which would be effected by the proposed project.

Thank you for the opportunity for comment on the proposed project.

Sincerely,

Jay R Broussard

Jay R. Broussard
State Historic Preservation Officer
Director, Department of Art, Historical and Cultural Preservation

JB/bc

LOUISIANA HEALTH AND HUMAN RESOURCES ADMINISTRATION

DIVISION OF HEALTH
P.O. BOX 60630
NEW ORLEANS, LOUISIANA 70160

STATE OF LOUISIANA · UNION JUSTICE & CONFIDENCE

EDWIN EDWARDS
GOVERNOR

December 31, 1974

Mr. Alton Mangum
State Conservationist
P. O. Box 1630
Alexandria, Louisiana 71301

Re: Review of vector control aspects of Kinder Watershed Project

Dear Mr. Mangum:

The Kinder Watershed Work Plan and the Draft Environmental Impact Statement have been reviewed by this office for probable effects upon insect vector control.

It is our opinion that implementation of the project as planned should reduce the breeding habitats of mosquitoes of several species including both flood water and permanent water varieties.

Thank you for providing us the opportunity to review this proposed project.

Very truly yours,

G. Roy Hayes, Jr.

G. Roy Hayes, Jr., Chief
Section of Solid Waste and Vector Control

CVA/rmn

cc: Allen Parish Health Unit
Jefferson Davis Parish Health Unit
Mr. John Koury, Sanitarian
Mr. Paul Scheppf, Entomologist

LOUISIANA FORESTRY COMMISSION

Louisiana Forestry Commission

James E. Mixon, State Forester

~~Box 19239, Broadview Sta.~~ Box 1628 Baton Rouge, Louisiana ~~70815~~ 70821

COOPERATION - PL-566 - Kinder Watershed

January 17, 1975

Mr. Alton Mangum
State Conservationist
Soil Conservation Service
P. O. Box 1630
Alexandria, Louisiana 71301

Dear Mr. Mangum:

This is to advise that we have no objection to the Environmental Impact Statement for the Kinder Watershed.

B. F. GRIFFIN - ASSISTANT CHIEF, FOREST MANAGEMENT

DY

CC: Mr. Duane Routh

Coding System for Inventory of Channel Work

Type of Work	I -	establishment of new channel including necessary stabilization measures
	II -	enlargement or realignment of existing channel or stream
	III -	cleaning out natural or manmade channel (includes bar removal and major clearing and snagging operation)
	IV -	clearing and removal of loose debris within channel section
	V -	stabilization, by continuous treatment or treatment of localized problem areas, as primary purpose (present capacity adequate)
	VI -	adequate
Type of channel Prior to Project	N -	an unmodified, well-defined natural channel or stream
	M -	manmade ditch or previously modified channel
	O -	none or practically no defined channel
Flow Condition Prior to Project	Pr -	perennial - flows at all times except during extreme drought
	I -	intermittent - continuous flow through some seasons of the year but little or no flow through other seasons
	E -	ephemeral - flows only during periods of surface runoff
	S -	ponded water with no noticeable flow, caused by lack of outlet or high ground-water level

APPENDIX H

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
M-1	563+28	II	M	E
	342+70	II	M	E
	90+00	II	M	I
	25+00	IV	M	I
	0+00	VI	N	I
L-1A	120+74	II	M	E
	0+00	II	M	E
L-1B	123+02	II	M	E
	0+00	II	M	E
L-1C	50+00	II	M	E
	0+00	II	M	E
L-1D	166+00	II	M	E
	0+00	II	M	E
L-1D-1	38+00	II	M	E
	20+00	II	M	E
	10+00	IV	M	E
	0+00	VI	M	E
L-1D-2	20+07	II	M	E
	0+00	II	M	E
L-1E	70+90	II	M	E
	0+00	II	M	E
L-1F	107+50	II	M	E
	0+00	II	M	E
L-1F-1	16+14	II	M	E
	0+00	II	M	E
L-1G	59+10	II	M	E
	0+00	II	M	E

1/ See Attached Coding System For Inventory of Channel Work

APPENDIX H

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work [1/]		
		Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
M-2	401+25	II	M	E
	290+00	II	M	E
	200+00	IV	M	E
	120+00	IV	M	I
	0+00	II	M	I
L-2B	93+50	II	M	E
	79+00	II	M	E
	60+00	IV	M	E
	10+00	II	M	E
	0+00	IV	M	E
L-2C	116+50	II	M	E
	0+00	II	M	E
L-2D	175+00	II	M	E
	116+84	II	M	E
	80+00	IV	M	E
	45+00	II	M	E
	0+00	IV	M	E
L-2D-1	14+00	II	M	E
	0+00	II	M	E
L-2E	34+00	II	M	E
	0+00	II	M	E
L-2E-1	35+00	II	M	E
	0+00	II	M	E
M-3	84+00	II	M	E
	40+00	II	M	E
	0+00	VI	N	E
M-4	54+00	II	M	E
	35+00	II	M	E
	0+00	VI	M	E

1/ See Attached Coding System For Inventory of Channel Work

APPENDIX H

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/ Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
M-5	596+00	II	O	E
	317+75	II	O	E
	150+50	II	M	E
	115+00	IV	M	E
	37+00	VI	M	I
L-5A	335+00	II	O	E
	250+00	II	O	E
	50+50	II	M	E
	20+00	IV	M	E
L-5A-1	116+00	II	M	E
	0+00	II	M	E
L-5A-2	83+00	II	M	E
	0+00	II	M	E
L-5A-3	38+00	II	M	E
	0+00	II	M	E
L-5B	250+00	II	O	E
	200+00	II	O	E
	20+00	II	M	E
L-5B-1	47+00	II	M	E
	0+00	II	M	E
M-6	208+00	II	M	E
	70+00	II	M	E
	30+00	VI	M	E
L-6B	58+00	II	O	E
	20+00	II	O	E

1/ See Attached Coding System For Inventory of Channel Work

APPENDIX H

CHANNEL WORK BY REACHES

Channel	Station	Inventory of Channel Work 1/		
		Type of Work	Type Chan. Before Proj.	Flow Cond. Before Proj.
M-7	256+00	II	M	E
	143+50	II	M	E
	90+00	VI	M	I
	40+00	VI	N	I
L-7A	50+00	II	O	E
	20+00	II	O	E

1/ See Attached Coding System For Inventory of Channel Work